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COLLOTYPE.

Upon a careful review of the various papers read before the London Photographic Society during the past year it will be remarked that probably few have had more superficial attention paid to them than those of Captain Waterhouse upon collotype printing; and yet, of all those accepted by the Society and read at the meetings, none have possessed more intrinsic worth, from their originality and from the importance of the subject upon which they treat.

Collotypic printing, in its various phases of Albertype, heliotype, autotype (we must not here confound the autotype *carbon* process with that specially under consideration), has not yet occupied the attention of photographers to the extent it deserves, and the papers in question are particularly deserving of notice, as showing in what way the light's action *in certain cases* may, as it were, be corrected or improved.

Just as in the case of a lithographic stone, when from an imperfection in the transfer certain spots have to be bitten away by means of acid, so in the case of the gelatine film, when, from a want of opacity in the negative employed or, perhaps, from an unequal sensitiveness in certain portions of the plate, an insufficient contrast occurs in the printing. By the mode pointed out by Captain Waterhouse (and we do not for a moment consider that his researches are one quarter completed) much of this irregularity may be remedied or modified. This at once places a new power in the hands of the operator, which may be employed by him very much to his advantage.

We do not say that a bad or carelessly-prepared plate may be made to produce as good results as would be ensured by perfect manipulation; but we do consider that in many cases the effect of a trifling over-exposure (and a very slight over-exposure makes all the difference between a good and a bad printing plate) may be remedied, and excellent results obtained. Witness, for example, the prints of map reductions exhibited at the last meeting of the London Photographic Society. Where could lines more perfect and free from what is technically termed "rottenness" be found? Perhaps it would be going too far to say that an impression from a copper plate would not excel them in the clearness and *cleanness* of line; but we think that the race would be a very close one. At all events, had these proofs been taken upon the paper usually employed by collotype printers, we can hardly imagine that finer or more delicate could be obtained. We commend the papers in question to the careful attention of those interested in the matter.

WHAT IS A DIALYSER? AND WHAT IS ITS USE IN PHOTOGRAPHY?

As it is not improbable that dialysers will be much used in photography during the year upon which we have now entered, it is expedient that in the first Journal of 1874 we should give such a description of a dialyser as will enable every experimentalist to make one for himself until the apparatus is commercially introduced.

Speaking in the most popular language at command, we may describe a dialyser to be an instrument by which a salt may be removed from a liquid in which it has been dissolved. Its application to photography has recently been proposed by Mr. J. King, of the Bombay Civil Service, who used it for the purpose of removing from gelatine emulsions that excess of soluble salts which, by crystallising in the film on the plate, would lead to disintegration and loss of sensitiveness. This application of the principle of dialysis embraces not merely gelatine emulsions, but collodion, albumen, and other emulsions, and is probably of more value and importance than we may be able adequately to realise for some time.

Mr. King has had two dialysers made after his own model, and, as he has left one of them at our office to be used in our own experiments and also to show to such as are interested, we here give a description of the instrument. A dialyser, we may state, is a vessel made of any kind of material that cannot be acted upon by the liquid in which it is to be placed or which is to be contained in it, but it must be a vessel without a bottom; it may, in short, consist of a deep frame alone. But it must have a bottom of a certain kind, and upon this depends its value.

The dialyser now to be described consists of a stout ring of glass, five inches in diameter and nearly two inches in depth. It has a spout or lip to permit of its contents being poured out, and it has a slight projection all round the lower edge to permit of the porous substance which is to form its bottom being tied on so that there shall be no danger of its slipping off.

In speaking of a porous substance as a bottom, let it not be imagined that we are alluding to such a material as filtering paper or felt; these would certainly allow the liquid contained in the vessel to pass through them; but that is not exactly what is wanted in a dialyser, for although it is a filter in one sense, it is not so in another. The bottom must be formed of such a material that, while under certain conditions it will allow salts to pass or filter through, it must not permit the liquid in which salts are dissolved to do so. Any material used for this purpose is designated a "septum," and this septum may be formed of a variety of substances, such as bladder, or, better still, of parchment paper. Indeed, in the majority of cases of dialysis the dialyser is composed of the last-named substance, which is now extensively manufactured and sold for several purposes, the covering of jam pots being, perhaps, that best known. It is made by immersing white unsized paper for half-a-minute in strong sulphuric acid, sp. gr. 1·842, and afterwards in water containing a little ammonia. Or it may be made by immersing the same kind of paper for a few seconds in sulphuric acid, diluted with half to a quarter of its bulk of water, the mixture having been allowed to cool before immersing the paper, and afterwards washing in ammoniacal water as before. By this treatment blotting-paper is converted into a tough vegetable parchment.

In putting the septum upon the circular frame which is to form the sides of the dish the parchment is cut a little larger than the size required, and is then damped with water, the edges now being gathered round the hoop and fixed in its place, either by means of an india-rubber band being sprung over all or by a piece of thread wound round it. The dialyser is now finished and ready for use.

Instead of being made of glass, the hoop may be formed of gutta-percha, porcelain, wood, or even of metal. But of whatever material or in whatever shape the ring or hoop be formed, the bottom ought to consist of the vegetable parchment described. The vessel will present the aspect of a small tambourine. It can be constructed in less time than it takes to write the description. We now come to speak of its use.

When any liquid is to be dialysed or have its crystallisable portion removed it is poured into the dialyser, avoiding the pouring in of too much at a time, and the tambourine-like little vessel is now set afloat in a large vessel of water. If the dialyser be formed of a heavy material, such as glass, it would sink in the water; in that case it would have to stand upon any suitable support in the larger vessel, into which water would have to be poured to such a height as to come up a little way above the bottom of the dialyser. Supposing the fluid to be dialysed consists of a solution of gelatine or albumen containing a large proportion of salt, the gelatine will remain in the dialyser; but the salt it contained will pass through the parchment septum and diffuse itself in the water below until every vestige of the salt shall have been removed from the gelatinous fluid. We trust that we have made quite plain what is meant by a dialyser.

We have now to point out its use in the preparation of gelatino-bromide of silver; and we may state at the outset that by its use a great difficulty in the way of preparing gelatino-bromide has been overcome. When mixing bromide of potassium and nitrate of silver in a solution of gelatine, bromide of silver, which is a fine powder, and nitrate of potash, which is a crystallisable salt, are formed; and as when this is poured upon a plate of glass to form a film the nitrate of potash crystallises all over and disintegrates the film, it is obviously desirable to get rid of it and leave nothing but bromide of silver present. The "happy thought" struck Mr. King that the dialyser would provide the very means for effecting this riddance; hence, after his gelatine had received the requisite doses of bromide of potassium and nitrate of silver, and had been well shaken, so as to secure combination throughout, he then turned the mixture into a dialyser, which he set in water sufficiently warm to retain the gelatine in a fluid condition. In about three hours the nitrate of potash will have left the gelatine, which, after being filtered, is ready for use in coating plates. Used previous to the action of the dialyser the gelatine would give a film quite reticulated and crystalline; but after this process the film is smooth, glossy, and homogeneous.

CARBON PRINTING.

"Coming events cast their shadows before." In England we have been for some time accustomed to note the steps rapidly and certainly tending to the adoption of one or other of the permanent printing processes of either "carbon" (autotype) or "lichtdruck;" but this has not, for the most part, been so apparent in the proceedings of the photographic societies upon the continent. It is, therefore, with much satisfaction that we observe in the last official report of the proceedings of the Photographic Society of France that carbon printing appears to have taken a firm hold upon the good wishes of our French brethren, though it would appear that they are as yet very far behind ourselves in the materials necessary for practising the process.

M. Despaquis has made some attempt to prepare a pigmented paper intended to preserve its sensitiveness for a lengthened period. This will certainly be a move in the right direction, and, when achieved, will prove a great boon to amateur as well as to professional photographers. But it would appear that the samples placed by him in the hands of the members of the Society did not yield the most satisfactory results. The complaint of most of those who had experimented with them was as to a great want of solubility, in most cases several changes of hot water being requisite to effect the solution of the non-isolated portion of the "tissue."

At the same sitting of the Society M. Gobert demonstrated the working of the "double transfer" process from plates of zinc or copper, the mode adopted being the one so well known in this country as that of Mr. J. R. Johnson. It is somewhat worthy of note that the fatty body employed by M. Gobert is precisely that employed first by Mr. Johnson, viz., a solution of stearine in alcohol, and which was almost immediately superseded in that gentleman's practice by a solution of resin and wax in benzole or turpentine. Indeed, upon reading the report of the meeting we could only express a wish that the demonstrator had had the opportunity of witnessing the process as employed in this country, or had availed himself of the published descriptions of it.

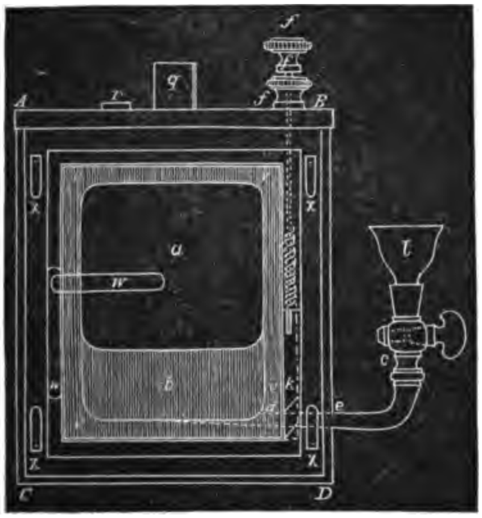
We took occasion in our last to call attention to the unsatisfactory condition of the London Photographic Society, and we showed the necessity of the revision of the laws which permitted the Council to be practically a self-elected and a self-continuous governing body. This evil has often been pointed out before, but no individual member has chosen the unthankful office of attempting to reform it. Before the accession to office of the present distinguished President the Society was rapidly drifting into a condition of hopeless insolvency and decrepitude. He seems to have imparted his energy to the Society, so that it has recovered its solvency and something more. But the best fruit of his labours is shown in the new life he has imparted to a considerable portion of the members. We are pleased to find that they will not be contented with having their affairs managed for them, but that they are about to put their house in order for themselves. We understand that a requisition, signed according to the laws by twenty members, has been forwarded to the President to call a special meeting of the Society, for the revision of the rules affecting the mode of electing the officers and council, so that they shall be elected directly by the member themselves, instead of, as now, by a nomination arranged in secret by the Council. This requisition is signed not only by some of the most active and independent members, but also by some of the Council; and it is understood that other members of the council, whose names are not attached to the document, will support the proposed improvements This is as it should be, and is far better than mere grumbling and fault-finding. We are glad that active steps are being taken at last; and from what we know of the gentlemen who have signed the requisition, supported as they will be by the rest of the Society, we are sure that the long-needed improvements will now be made.

DR. STEIN'S HELIOPICTOR.

Our readers will remember that, some weeks ago, we gave some notice of this invention in our report of the meeting of the Photographic Society of Berlin. Since then Dr. Stein has published a detailed account of his invention with abundant diagrams and the specification of his patent. As he has been at the trouble and expense to patent his invention in Austro-Hungary, Germany, France, England, Belgium, Italy, and North America, it is clear that he must have a very strong belief in the thing he has found out. The purposes, too, to which he proposes to put it are many of them of a novel kind, being, if practicable, aids to science of that type which science very much wants. We therefore propose to place with some detail before our readers the construction and uses of this "heliopictor," in order that its worth or unworth may be judged by the English public.

Dr. Stein commences his paper by pointing out the fact that photographers have from the very first striven against the necessities imposed upon them of working in the dark; that landscapists, especially, have sought to obtain facilities for practising the art out of doors such as the dark laboratory, however portable, would never admit of. Hence, within the last decade great efforts have been made to mitigate the inconvenience arising from this cause; and the lines on which these efforts have run have either been that of dry plates or of moist. The uncertainties accompanying the employment of these are, however, too well known to require specifying. Most methods for working moist plates in the field without a tent are very complicated. The only one which, perhaps, is not so is the *cassette* of Sabathier Blot as improved by Dr. Weiska, which is filled with a developing trough having a yellow pane through which the development can be watched. But the operator, as a rule, cannot see what he does, and the employment of such apparatus usually demands much more trouble, foresight, and practice than the ordinary labour in the dark box does. After enumerating the excellencies and defects of several other inventions—a task which we need not impose on ourselves here—Dr. Stein proceeds to state that the goal which he had set before him was to construct an apparatus not so much for the special benefit of the landscape artist, to enable him to work securely and without the necessity of employing a heavy tent, but rather for the benefit of the man of science, the soldier, and the amateur, so that they might have at hand a means of photographing which would not demand of them any great skill or occupy any long time in learning.

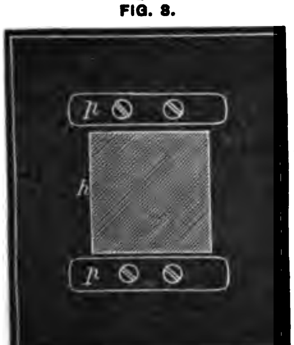
FIG. 1.



This apparatus Dr. Stein believes that he has succeeded in designing. It consists of a camera with a deep *cassette* (A B C D, *fig.* 1), the slides of which are partly windowed by panes of yellowish-brown or red glass (A, *fig.* 2). The depth of the slide is adjusted according to the size of the lens or of the camera; but the bigger the picture the deeper must be the slide. But for whole plates, the most useful size, a depth of focus one and a-half to two inches should not be exceeded, and the *cassette* or slide may be adjusted to any useful size of camera or lens, and be employed therewith. There is placed on it a movable glass frame (*v v v*, *figs.* 3 and 5), which also, indeed, may be made of asphaltised wood, gutta-percha, or papier-maché, and the back of which must be closed for about a fourth of its height (*b*, *fig.* 1). On the opening side of the *cassette* the glass frame is ground smooth, in order to enable it to be covered close by a *matt* pane of plate glass (*s s*, *fig.* 2). A thin layer of vulcanised rubber is laid between the frame and this pane. The ground glass thus laid on the frame is held there by its clips, and on it the image may be viewed and adjusted. When that is done the ground glass should be removed, as will be shown in the detailed description of the operations, so as not to be mistaken for the sensitive plate. The employment of a finely-polished surface in the edges of the glass frame will render the use of *caoutchouc* superfluous, the plate adhering closely enough without it.

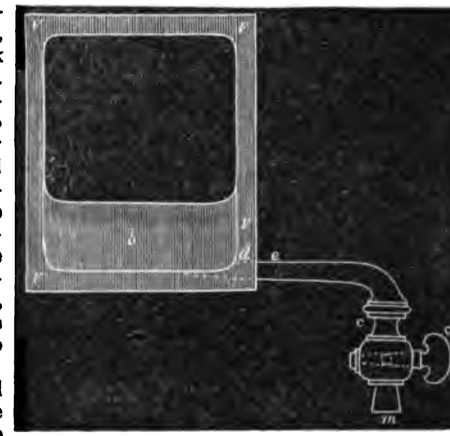
FIG. 2.

FIG. 3.



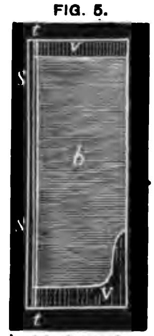
The plate glass collodionised plate prepared for the negative is pressed against the rubber matt or the polished edges of the glass frame by the strong springs of the *cassette* shutter (*p p*, *fig.* 3), and the shutter is closed by the pins (*x x x*, *fig.* 1), so that it presses hermetically close. The cavity for the silver bath is thus fully constructed, and the bottom of it consists precisely of that layer of iodide which it is necessary to impregnate with silver. Laid flat the thing looks like a tray or shallow dish, quarter-covered at the top. In order to bring the silver solution into this cavity there is a round hole (*e*, *fig.* 1), which has a corresponding opening (*d*, *fig.* 1 and 2) in the lower end of the trough. This inner opening is closed by one of the shutters of the slide (*k*, *fig.* 2). It is pressed down by the spring *i*, and moved up by the spring *f*. A tube is passed through this opening, and turns up outside at right angles, ending in a stopcock and funnel (*c* and *l*). This funnel corresponds in capacity to the dish formed by the quarter-covered back of the cell inside. Hence the size of the funnel is regulated entirely by the capacity of the camera-contained bath, and that again by the size of the plates to be taken.

FIG. 4.



By pushing the end of the bent tube into the opening the spring shutter is opened, and that shutter instantly closes on its withdrawal, so that being inside it closes the opening before the tube is wholly withdrawn, and hence prevents the possibility of light getting in. The special points to note in this general description is that the inner cavity of the slide contains no trough ready formed, but requires the presence of either the ground glass or the sensitive plate to form one. Thus in the cross-section given in *fig.* 5, *s s* is the negative plate, *t t* the rim of the glass frame, *v v* the upper and under edges of the frame. Under the *v* to the right is the upright side or back, which goes to form the side of the trough, and which is made either of glass or wood, as stated above.

FIG. 5.



Such being the general idea of this piece of apparatus we pass on now to consider how it is worked, taking the operations in the order in which they are to be performed.

1. The ground glass is placed on the frame, and held there by means of the spring *w* (*fig.* 1), and the camera adjusted to the object to be photographed, which is focussed as usual.

2. The slide is removed from the camera, the spring at the back shifted, and the ground glass removed and put aside.

3. A clean plate of glass of the size required is wetted by water, and then coated with a thin solution of albumen, consisting of water, 800 grammes; fresh-beaten white of an egg, twenty-five grammes; glacial acetic acid, ten drops; iodide, half-a-gramme. The plate is then dried. It is a very good plan to have a number of these albumen-coated glasses in store. Such a plate is easily coated with collodion. When the collodion has drained, and before it is dry, the plate is put down where the ground glass was, and the outer shutter of the slide closed firmly down on it.

4. The tube, with the funnel, and having the stopcock closed, is inserted in the opening at the bottom of the slide. The funnel is then filled with silver solution of the strength of one to ten, slightly acidified. The stopcock is then opened and the liquid allowed to run into the slide. It is easy to see whether too much is let in for the capacity of the cavity inside, as it can be observed through the glass shutter *a* (*fig* 1), which closes the slide behind the cell on the quarter-closed side. This glass should, in preference, be red; it is more transparent than the deep yellow necessary for the purpose of shutting all light out. Whenever enough has been passed through the tube the stopcock is shut again, and the slide is gently canted over so as to allow the silver to flow all over the glass collodionised plate. It may be moved about to keep the silver in a state of agitation, and facilitate the formation of the iodised film, which will be thus fully formed in about ten minutes' time. The whole operation may be comfortably watched through the coloured shutter, and as soon as the greasiness has quite disappeared the apparatus is again set upright, the funnel is taken out, and the tube is reversed as in *fig* 4, the stopcock opened, and the whole allowed to drain off to the last drop into the stock-bottle through a filter. When this is accomplished the tube is withdrawn, and the aperture is instantly closed, as already described, by the inner spring shutter.

5. The slide is now again placed in the camera, the shutter drawn up, and the plate exposed in the usual way. The rod *r* (*fig.* 2) draws up the coloured sight or observing-glass *a*, and allows the light to pass freely to the plate when the cap is removed from the lens.

6. When the plate has been sufficiently exposed the lens is capped, the glass shutter *g* again let down, and the slide removed from the camera. With another tube and funnel the operation before described is again gone through for the purpose of developing the image. Iron or pyrogallic developer is poured through the funnel into the cavity at the bottom of the slide, and then flowed over the plate as the silver had been. The developer must be at once flowed over, and to that end the slide should be laid steadily, but gently, in a horizontal position. The smaller pane of coloured glass *h* (*fig.* 3) suffices to enable the operator to see whether and when the plate is developed enough; and when itis so he simply repeats the draining operation practised before when sensitising the plate. Water is then poured in for rinsing the plate, and, if necessary, by this means it may be intensified.

7. The plate is removed from the camera, further washed, fixed in the usual way, dried, and varnished. The inner part of the camera has, of course, to be taken out and thoroughly cleaned after each operation. This is a work of the simplest kind, however, as the glass interior has no sharp angles nor corners, and if properly made ought not to secrete about it any noxious matter not removable by a rinse.

Such is in detail the general use of this apparatus of Dr. Stein's, and we fear that it cannot be looked upon as much of a relief to outdoor photographers. It would be impossible for them in most cases to be able to coat a plate free of dust in the open air; and even were it coated uninjured it would be still more impossible to manipulate it afterwards with any good result in strong daylight, much less in sunshine with that light—no matter how red, still light, and therefore to some degree actinic—streaming in on both sides of it. The plan is, however, an ingenious one, and as a plaything in the laboratory of a scientific amateur may prove amusing. Dr. Stein has indeed, as we have already intimated, adapted his camera to all sorts of scientific purposes, and some of these adaptations appear to be really ingenious. The description of them would, however, occupy far too much of our space, and we therefore must leave them out. Should we, on examination, find them to be of any value experimentally we may return to the subject.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I suppose that I ought to commence my lucubrations for a new year by making my *salut*, and uttering a few, nice, complimentary words expressive of "peace and goodwill," "many happy returns," and soforth; but these innocent, kind, good expressions run so much in a rut at this period of the year that I shall take them all for granted, and merely confine myself to the familiar salutation uttered by the universal favourite of the season—Mr. Clown—"Here we are again!" which, at least, is a fact, if there be but little that is emotional about its expression. *Shall* we see the end of the year now begun? Possibly we may; but really I must shirk a reply to this important question. Let us hope that we shall; but according to the cool, soulless calculations of the actuary some that I now address will undoubtedly have left us before the present year has taken its departure—very possibly the writer of these *Notes* among them. Some that I did address a year ago I know have "gone on." Let us all, as photographers, be philosophers, and look probabilities and possibilities fairly in the face without flinching. If it be really the fact that, as Longfellow says, "there is no death; what seems so is transition," then there is a chance of us all meeting again, even after we have, according to our own great, world-famed poet, "shuffled off this mortal coil." And with this let us be content at present.

To whom does a negative belong? To whom does an overcoat belong? You complain of frigidity to your tailor, and he says "I'll cure that," supplying you with an overcoat, for which he charges you, say, eighty shillings. He sends in his bill and you pay it; but, when the season advances and the thermometer rises, he wants the overcoat back. This way of putting a photographic matter is not too far-fetched. A certain defunct company charged a certain living artist a certain sum for taking a negative, which negative was used by them in the production of certain results, also charged for. Surely the negative belongs as much to the party paying for it as did the overcoat in the illustrative incident I have forced into this short *Note* by way of comparison. Business is business; if you charge a man, and he pays, for a definite thing, that article must be held to belong to that person after he has discharged the bill. So with negatives. *Moral:* Do not make a definite charge for taking the negative; but, if you are so short-sighted as to do so, hand over the negative.

I am glad to see Mr. W. H. Warner back again among the photographic fraternity. I thought he had left us for ever, and I had pronounced a kind of "fare thee well, and if for ever" sort of valedictory address on his making his photographic *congé*, but I welcome him back. I do not, however, *quite* see in hot water all the virtues which he desires to impart to it. "If," he says, "you take *aqua distillata* and boil it you find it throws down heaps of impurities when silver is added to it." Now we all know that chemical action is aided by heat; but in what respect boiling distilled water (if Mr. Warner will allow me to reduce to the vernacular his Latin term) differs in its chemical constituents from cold distilled water I am rather at a loss to know. Then in what respect nitrate of silver when acted upon by hot distilled water and the same salt when dissolved in cold distilled water differs I am also puzzled to ascertain. Mr. Warner says that by the use of hot water "heaps of impurities" are thrown down which presumably would not be thrown down by cold distilled water. Now here is the question—What kind of impurities are thrown down from nitrate of silver by hot water? Nitrate of silver consists of pure silver and nitric acid—and nothing else. What, then, is thrown down? And does the impurity spoken of belong to either of these constituents of nitrate of silver? Or are we to understand that the "impurities" thrown down come from the water? If so, the less said for the purity of the water the better. Differing from Mr. Warner in his estimate of the value of hot or boiling water for making up solutions, I am still quite open to be convinced of its value. Will he kindly make a convert of me by a few words of enlightenment as to the *rationale* of the impurities which, he says, are deposited from nitrate of silver?

The Council of the London Photographic Society seems to be among the "breakers." Mr. Matthew Whiting—who, by the way, is one of the Council—suggests a simple mode of not only getting this unfortunate body out of their troubles, but of making them stand in good repute in time to come. It is the same as that mooted by Mr. Jabez Hughes, yourselves, and Mr. Stillman, to wit, that members, instead of being elected on the Council for life, should retire by rotation, their places being filled by others proposed by the members of the Society and not by the Council, each candidate being balloted for. This will prove a short, easy, and most effectual remedy for the evils now so loudly complained of. Of course the small party in the Council who have been in perpetual possession will oppose such a measure of reform with heart and soul.

Well, "I'm darn'd!" This ejaculation is, of course, American, and equally, of course, savours of irreverence; but it is the very expression that rose to my lips when reading the graphic account of the experiences in photography of Sergeant-Major Perry. He spoke of the way in which a fiery war-charger was to be arrested in his mad career and made to pause, in order to have his portrait taken, by being confronted by a man with a cat under his arm, the cat being "throttled" at the last moment should all else fail! The exact connection between throttling the cat and puzzling the horse I have not yet been able to grasp, because if the former act be energetically performed no *audible* consequences will ensue; but if it were desired that the cat should act upon the auditive nerves of the nobler quadruped I would suggest something by which a screech or yell should be raised as far preferable to throttling. A pinch of the tail has been known to effect wonders in this direction; but a better way would be to give the cat the last paragraph published by *The Times* to read, relative to collodionising prints, and if that do not provoke the brute to go into cacchinatory fits loud enough not merely to astonish a horse but to awaken the "seven sleepers" it would be because that cat has no eye for the sublime or the ludicrous. "Dogs," says the Sergeant-Major, "are easily got steady, as a rule, by the sight of a cat." My dog "Pompey" does not quite fall within this rule. When *he* sees a cat he appears to be pervaded by one impulse only, which he promptly acts upon, viz., to ascertain without any delay if the feline hide be sufficiently tough to resist the passage of his "molars." When I wish to take a negative of Pompey I give him a heavy dinner, to which I add forty grains of chloral, and the faithful brute is as quiet and as stupid as a lamb for some hours afterwards. In fact, you might then almost hang him up by the tail without calling forth any very serious remonstrance.

The astonishing things that artists have ever and anon discovered in connection with photography are enough to make one gasp. Passing over the wonderful errors in perspective which result from using a camera, the wonderful departure from the true representation of colour from using chemicals, and many other wonders which exist only in the brain of the poor artist, and which a *practical* acquaintance with photography would dispel, we come across one of the most astonishing of the whole family of wonders, viz., the development of an image on collodion before it is formed by the requisite exposure to light. If it be really true, as Mr. George Croughton affirms it to be, that Colonel Stuart Wortley "has a method of developing before exposure," I think I am entitled to ask what benefit he derives from the exposure. If *I* could only obtain a picture capable of being developed into a good negative without exposure in the camera, I should take good care to dispense with both camera and lenses. But it may be asked—How does the latent image get on the plate so as to be called into existence by the developer? This I cannot tell; it rests between Colonel Wortley, who is alleged to have done it, and Mr. Croughton, who alleges that the Colonel did it.

It turns out that the rumour to which I gave publicity in my last *Notes*, relative to Mr. Woodbury's having declined the bronze medal offered to him by the London Photographic Society, has turned out to be a fact. I have now heard another rumour, which is to the effect that the Council of the Society are having some *silver* medals struck. To whom they are to be awarded I really cannot say, but I am all anxiety to know who are to be the recipients. Will it be any members of the Council?

THE REFRACTION AND DISPERSION OF THE ATMOSPHERE.

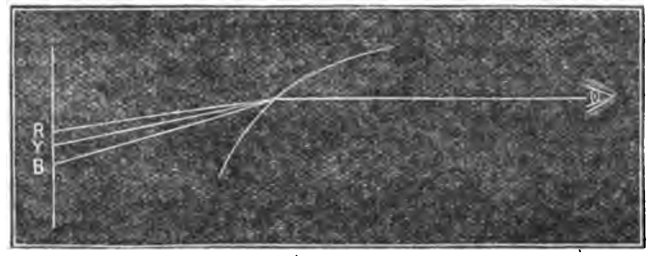
Accepting the explanation I have already given of the colour of the sun's final ray, it becomes evident that any body outside our atmosphere shining with something like a white light—whether that light be intrinsic or the result only of reflection—will exhibit the phenomena of colour caused by atmospheric dispersion when examined with the aid of suitable instruments. With my own three-inch telescope I find the green and red effects are distinctly to be seen on the upper and lower limbs of our satellite, both when examined on the artificial horizon and when she sinks behind, or reappears below the well-defined boundary of a piece of cloud.

The rapid changes in colour observable in the case of almost any large fixed star at an elevation of twenty or thirty degrees above the horizon—and which changes take place almost every moment of time, and vary between red, green, and blue—may, I think, be fairly attributed to the same cause as the colour in the sun's final ray. Particles of dust floating in the atmosphere act, I apprehend, for the moment in the capacity of a diaphragm or horizon, thus enabling the eye to perceive, even in the light of stars, the dispersive power of the aërial ocean by which we are surrounded.

The very impressive display of colours seen often during the totality of a solar eclipse (some interesting accounts of which are given in Chambers's *Descriptive Astronomy*) may, it seems to me, not improbably result from atmospheric dispersion, the diaphragm in this instance being called into requisition before the refracting medium. It would be unwise, however, to pronounce too positively on the point without examining every detail of evidence on the matter with care. The very indifferent definition with which the planets are seen when at an elevation of say twenty degrees above the horizon ought, I think, to be in some measure attributed to the dispersive power of the atmosphere. It is, I believe, generally attributed to the unsteadiness of the air; but this, I am quite sure, is in many instances fallacious. In winter, on days when the sun is obscured, the air is often so still and clear that objects of small size and considerable distance are visible with wonderful definition. I have several times seen buildings at a distance of twelve miles, of very much smaller angular magnitude than Saturn, with a sharpness of definition incomparably greater than seems possible when examining the planet in question, or indeed any other, even when twenty degrees above the horizon; and yet, so far as the movements of the atmosphere contribute to the destruction of definition, there can, I think, be no doubt that such buildings are greatly at the disadvantage.

I have, I know, a weakness for the use of diagrams—a weakness which increases as my powers of verbal expression decline. I had, therefore, made up my mind to say what I have to say without resorting to their use; but the following few lines will enable the reader to get at my meaning, and save me probably about a column of indifferent composition.

Let the curved line represent the boundary of a refracting medium; R Y and B different portions of a body external to it. From each of these portions let rays of various refrangibilities be emitted. We can then understand a ray from B proceeding along the line shown first to the refracting medium and then to the eye. We can also understand another of less refrangibility proceeding from Y and entering the eye in the same straight line, and another one, of less refrangibility still, proceeding from R, and also entering the eye in the same straight line. As each of these rays comes from a



different portion of the object under inspection, clearly the linear definition must be impaired from the overlapping of their images, although, for reasons which are obvious, the colour may remain true to the original.

On the 16th of May, in an article on *The Effects of Coloured Glass on Light*, I mentioned that, on making a telescopic inspection of the solar disc with the intervention of certain thicknesses of blue and yellow glass, I observed a discontinuous annulus of red around the sun. Its cause, as I remarked, I was unable to explain. In repeated efforts to make a drawing of it since that time I have found the ruddy line exhibiting a remarkable tendency to conjunction with the apparent upper solar limb. The use of the semicircular diaphragm has made this observation much more exact; for, by examining the solar limb only in the very centre of the field, as this means enables me to do, I rid myself of instrumental errors, and observe (at least I apprehend it so) only phenomena of an objective nature. In these circumstances I find the red confined to the lower (or apparent upper) limb, and the upper (or apparent lower) limb I find as strongly tinged with green and blue. The conclusion to me is irresistible that atmospheric refraction is the cause as heretofore of the coloured fringes seen when the blue and yellow glasses are employed. For reasons I am yet unable to explain the coloured fringes are of vastly greater width than when observed without their aid.

I may remark that my opinion of the visibility of the solar flames, by the means I have already described, increases with the number of my attempts at observation.

Speaking of the effects of coloured glass reminds me of the letter written by Mr. Allen in reply to some remarks of mine. This letter at the time of its appearance I did not think deserving a reply, nor do I think so now.

> "A friend should bear with a friend's infirmities,
> But Brutus hath made mine greater than they are!"

I make no pretensions to infinity of knowledge or infallibility of judgment. At the same time I do not possess the childish ignorance which Mr. Allen has attributed to me, nor do I need to have those pages indicated to me in which he retails the opinions and results of others together with original errors of his own—errors as unreasonable as any which I have, but coupled with a degree of pedantry which I venture to believe I have not. All the same—Mr. Allen was quite right in his statement that the cobalt blue glass of commerce transmits red rays as well as blue. My own failure to observe that fact was one of those stupid blunders which men, who are but fallible, will sometimes make.

The writer of an article which appeared in this Journal on the 28th of November last would seem to regard the coloured fringes visible at the setting of the sun as, after all, merely the effect of contrast. This, I may remark, was my own opinion some years ago when the phenomenon was new to me. That this opinion is untenable I think is proved by the fact of the sun's lower limb always being fringed with red, and its upper one with green or blue, and never the reverse, as seen with telescopes of low power. I know of no hypothesis which will account for this but atmospheric dispersion. There are many other facts which go against the theory of illusion; but I will content myself with naming only one, and that is, that the brightness of the final coloured ray of the setting sun is fairly comparable with the brightness of the Sun himself, whilst the dull images of complementary colour impressed upon the retina in the absence of the object which impressed them are otherwise.

D. Winstanley.

P.S.—Since writing the foregoing (now some weeks ago) I have on several occasions observed the splendid star Sirius when at an elevation of three degrees only. A power of one hundred and twenty reveals a complete spectrum, the red end being, when an inverting eye-piece is used, invariably at the top.—D. W.

NOTES FROM THE NORTH.

Our "Peripatetic" friend has recently been receiving more than his of notice. In his *Notes* of December 5, he says:—"What the South usual share of attention, and I must not let him off without a modicum Americans are doing, and how photography and photographers prosper there, nobody informs us."

Well, so far as one little portion of that interesting country is concerned, I am in a position to give him, or any other body who wants to make his fortune, a wrinkle. I have before me the *British Guiana Almanac* for 1873, from which I learn that in that large colony, including an area of a hundred thousand square miles, with two large cities, and a very extensive suburban population, there is only one professional photographer, and, although the almanac does not say it, I know that his ability is of a very moderate description. It is hardly conceivable that, setting aside Berbice and the country altogether, Georgetown, the capital of the colony, containing a population of over 36,000, should have its wants photographic supplied by one man living in a by-street; but such is undoubtedly the fact. It is true that occasionally they have a flying visit from an enterprising Yankee, who wants a holiday and makes it pay by doing a roaring trade for a month or two; but I am certain that if a really sober, energetic young man, thoroughly up in doing good work, and with a couple of hundred pounds in his pocket, would start for Demerara at once, he would make his fortune in a very few years. Glorious light all the year round, and ten dollars (£2 1s. 8d.) per dozen! Think of that!

Mr. W. H. Warner, late of Ross, is truly a funny fellow, and somehow I cannot help liking him almost better than any of the other contributors to the Journal. He writes with such simple confidence and childlike belief in his own curious notions that he puts criticism out of the question; but I cannot say as much for W. De W. Abney, R.E., F.R.A.S., F.C.S., writing on Warner in a contemporary of the 19th inst. Of course I do not find fault with his trying to set Mr. Warner right; but surely such a simple matter might have been done without libelling a large and not unimportant class of Her Majesty's subjects as he does in saying "the distilled water supplied by druggists is usually most impure." Lieut. Abney may have been unfortunate in his selection of druggists, but his statement is not the less untrue on that account. I believe the druggists throughout the country, and I know that those in this part of it at least, are in the habit of supplying as pure an article as even Lieut. Abney can require, and I hope he will take a friendly hint to be more cautious in his statements in future.

Several of the correspondents of the Journal have been making merry over the statements of Mr. Neilson and others as to the long exposures required for the production of their large direct heads; and, although I have no objection to their being merry especially at this season, I think the subject much too important to be dismissed in that way. In spite of all that has been said to the contrary, and notwithstanding Mr. Beattie's assertion that the question was "positively settled some years ago," I think there is a charm about large direct heads wholly wanting in even the best enlargements which will always make them worth sitting even *ten minutes* for, should that time be found necessary. In point of fact, there is really no great difficulty in sitting ten, or even fifteen, minutes, provided the lens be not uncapped too soon. When the sitter is placed in position, with head-rest, &c., properly adjusted, the ordinary way is to commence the exposure as soon as possible. This is the grand mistake. The muscles are in a state of tension, which may be maintained for twenty or thirty seconds; but they soon begin to relax, and gradually the head and shoulders undergo a slight subsidence, sufficient to mar the beauty of the negative. At the end of one or two minutes, however, the relaxation has attained its maximum, and the sitter may then be trusted to remain unchanged for any reasonable time. If this be true—and I speak from a tolerably large experience when I say I think it is—the lesson is obvious:—Do not uncap the lens until the sitter has sat from one to two minutes.

I am glad to see from Mr. Noton's paper, Mr. Pumphrey's advertisements, and many private communications, that permanent lime cylinders are engaging attention. I have had several complaints of the cylinders cracking when exposed to the oxyhydrogen flame, but found in all cases that the fault arose from imperfect drying. It is of the utmost importance that all the water should be driven off. Mr. Noton's idea of forming them by strong pressure is very good. I wish he would send me one or two for trial.

John Nicol, Ph.D.

PRINTING, TONING, AND FINISHING.

[A communication to the American Photographic Convention.]

The silver print is formed by the action of light through the negative on a sensitive surface consisting of certain salts of silver and certain organic substances. The salts of silver chiefly used are the chloride, Ag Cl, and the nitrate, Ag NO_3. The principal organic substances are cellulose, gelatine, and albumen.

Pure nitrate of silver is not acted upon by the light. Pure chloride is reduced on exposure to a violet subchloride, Ag_2Cl, which dissolves in the fixing bath used to remove the unreduced chloride. By adding an oxidisable organic substance, and using both nitrate and chloride, the silver is reduced by the action of light to a suboxide Ag_2O, which is not dissolved by the fixing agent. Accordingly, the paper upon which the print is to be formed is sized with gelatine or albumen. Other organic substances having the property of absorbing oxygen, and serving to fill the pores of the paper, are also sometimes used—such as starch, casein, arrowroot, tapioca—these substances having been found useful in aiding the reduction of the silver, or, in other words, in giving sensitiveness to the paper, while at the same time they retain the print upon the surface, thereby giving it vigour and brilliancy not otherwise obtained.

The preparation of the paper previous to the silvering has come to be considered a separate branch of the photographic art. The work of the printer is understood to begin with silvering the paper, and this he is obliged to undertake without knowing the kind or quantity of the salt employed in its preparation. He must, therefore, find by experiment, or he must be informed by some other person who has found by experiment (or otherwise), how to proceed with each different quality of prepared paper to obtain the results desired.

A knowledge of the kind and quantity of salt employed in the preparation of the paper would undoubtedly enable experimenters to arrive at a more definite and satisfactory understanding in regard to the subsequent treatment. One sample of paper, by reason of the strength of the salting, may require a correspondingly strong silver bath. One brand of paper, owing to some property it possesses, may give beautiful results if silvered after some unusual formula—for example, the bath consisting of nitrates of magnesium and sodium and a salt of lead with the silver nitrate; while with another paper the compound will work discomfiture and defeat.

The different nitrates formed by the reaction which takes place when the paper is silvered will produce variable results. If the paper be salted with chloride of ammonium, nitrate of ammonium will be formed in the paper and bath—

$$Ag\,No_3 + H_4N\,Cl = Ag\,Cl + H_4N\,NO_3.$$

Chloride of sodium will give nitrate of sodium; chloride of calcium nitrate of calcium. These nitrates are all deliquescent. On the contrary, the nitrate of barium, which would form if the chloride of that metal were used, requires eight or ten times its weight of water to dissolve it. Again: if chloride of ammonium be used, sixty-eight per cent. of this salt is converted or transferred to the chloride of silver which is produced, while only thirty-two per cent. goes to the new nitrate. Chloride of barium, on the other hand, furnishes only thirty-four per cent. (only one-half as much as the chloride of ammonium) to be converted into chloride of silver, while sixty-six per cent. is set free, and is, with the nitric acid liberated from the silver, used in forming nitrate of barium. From these examples it may be deduced that to complete the study of the science and art of printing an exact knowledge of the substances employed in the preparation of the paper is necessary.

We find a great variety of formulæ for printing solutions, and no small amount of conflicting testimony in relation thereto. Some say the solution should be acid, some that it should be neutral, and others that it should be made and kept alkaline. Some recommend the use of ammonia, while others condemn its use in the bath. There is also a great diversity in the strength of the solutions recommended. Different experimenters set about their investigations in different directions, and arrive at various conclusions.

Notwithstanding the great diversity in the formulæ of different photographers, it is not true, as might be expected, that a difference equally great always exists in the quality of the prints produced. The formulæ may differ through broad limits, while the forces of nature, while not seriously obstructed, work out similar results. It is true, however, that some processes are attended with disadvantages which impair their value, while others possess advantages which recommend their use.

Take, for instance, the silver printing bath given in one of the most recent of modern works (Mr. Anderson's). According to this author the strength of the bath should be from sixty to eighty grains to the ounce, and be made slightly acid with nitric acid. This bath will give first-class prints. There is no question on this point. What, then, are the objections to it? These are given by the author a little further on. He says:—"Add to it an ounce or two of kaolin and shake it thoroughly, when it may be exposed to the sunlight until next morning; when filtered it will be ready. In a short time, however, the bath turns brown and becomes charged with organic matter, chiefly albumen. The remedy in this case is to boil the bath well away, filter it, and dilute it to its proper strength."

The disadvantages of this bath, then, are—

1. The kaolin, which makes a muddy mess, and is a nuisance.
2. Setting in the sunlight until next morning.
3. In a short time it turns brown.
4. Boiling it well away.

These are troubles enough for one little bath; larger ones in proportion. But they may all and severally, collectively and individually, be dispensed with.

The strength of the printing solution has been the subject of much comment, and it is one of considerable importance. Although the authors of nearly all the works on photography agree in recommending strong solutions—say from sixty to 100 grains to the ounce—yet it can be demonstrated that a forty-grain bath will produce prints equal in every respect to those produced by stronger solutions.

Now paper requiring a bath of 100 grains should contain, for each unit of surface, two and a-half times as much of the soluble chloride as that requiring a forty-grain bath. It follows, then, that each sheet silvered on a 100-grain bath should convert two and a-half times as much silver as the forty-grain bath, while the free nitrate of silver withdrawn from the bath by the paper will contain the same proportionate excess. It will not be much out of the way to say that an ounce of silver made into a forty-grain bath will silver two and a-half times as many sheets as the same quantity of silver in a 100-grain solution. This is on the supposition that the strength of the salting varies in the same proportion as the silver. The 100-grain bath will give more free nitrate to be washed from the prints, and more unreduced chloride to be removed by the fixing bath. Figure it as you will, it is a matter of no small importance on the score of economy whether a strong or weak solution is used, provided, as is claimed, the weaker solution is not used at the expense of some quality of excellence in the resulting picture. But, as above intimated, much depends upon the preparation of the paper, for the salting may be such that a forty-grain bath would dissolve part of the albumen—sufficient to impair the brilliancy of the print. Suppose a paper salted with a chloride whose base gives a very deliquescent nitrate which has not the property of coagulating albumen. It is probable that, on floating this paper on a forty-grain bath, so much silver would be converted into the chloride from the solution in immediate contact with the surface of the albumen that the impoverished solution, aided, it may be, by the new nitrate, would dissolve a portion of the albumen. In such case the silver bath must be strengthened, and I remember to have used paper that for the best results required a bath 120 grains strong.

There are several brands of albumenised paper now in the market, well known and in general use, that give excellent results with a printing-bath of from thirty to fifty grains to the ounce. With these several qualities of paper I have experimented more particularly and carefully during the last year, with the special purpose of finding, if possible, some definite relation among the various operations concerned in the production of the print. I will now state my method of procedure, which is the result simply of my experiments and of such information as the various, plentiful, and somewhat contradictory literature pertaining to the subject affords. You will take it for what it is worth without any admonition to that effect.

The standard printing bath is prepared as follows:—

Nitrate of silver	8 ounces.
Water	80 fluid ounces.

Dissolve; then add—

Concentrated ammonia	4 drachms.
Nitric acid, C.P.	4 „

Make slightly alkaline by the addition, if necessary, of a few drops more of ammonia. It is kept slightly alkaline.

Silvering the Paper.—A table somewhat larger than the sheet of paper is covered with velveteen. Upon this the paper is laid, and the albumen surface is briskly rubbed with a bunch of cotton, or, better, with a soft pad covered with silk. The pile of the velvet upon which the paper is laid serves to hold it from slipping. The rubbing prevents the silver solution from drying in drops or tears, which frequently occasion great annoyance. I imagined the effect produced by rubbing might be due to electricity, and this idea suggested silk as a substitute for the cotton. I prefer the silk, but the electrical question remains undetermined. The paper is then rolled up in the form of a scroll, which is held in the left hand and placed upon the solution (previously poured into a pan of suitable size), while the free end is drawn over the surface by the right hand, the unrolling being regulated by the left. This manipulation being skilfully performed, the possibility of the formation of bubbles on the paper is precluded. In warm weather the paper is left in the solution about one minute; in cool weather two or three minutes. The paper is then slowly lifted from the bath, so that but little of the solution is drawn up by cohesion. Lastly, it is reversed and hung up to dry by the end which was last to leave the bath. Hardly a drop will leave the paper after it is suspended.

Management of the Silver Solution.—By the following method the solution is maintained in as good condition as when first prepared. After silvering the paper supposed to be required for the day's use, the solution is left standing in the pan until again wanted. Meanwhile the organic matter acquired from the paper, and which if poured into the bottle would in a short time discolour the solution, rises to the surface, oxidises, and forms an insoluble scum. When again required for use the solution is poured into the filter, through which it passes as clear and free from impurities as when first prepared. Another bottle of sufficient capacity, containing clean water for rinsing, with funnel and sponge, is at hand. The pan is rinsed and sponged, and the rinsing water returned to its own bottle. The solution, when filtered, is tested by the argentometer. If too strong a little of the rinsing water is added through the filter, and it is ready for use. By this method the solution varies less in strength than by the usual method. The evaporation is sufficient, frequently more than sufficient, to keep up its strength.

Managed in this way this bath never requires kaolin, never needs to be set in the sun, never turns brown, does not require boiling, and dispenses with the use of alcohol, which, when freely used, becomes an expensive luxury. It positively improves by use by acquiring nitrates of the basis employed in salting the paper, and may then be used at from three to five grains less strength than at first.

W. H. Sherman.

(To be continued.)

MY *CARTE*; AN AMUSING REMINISCENCE MORE SUITABLE THAN SCIENCE FOR THE SEASON.

In looking over a batch of newspaper cuttings in search of some evidence I wanted I came across the following. As it is full of humour and is pleasantly written it struck me it might amuse your readers at this season, when the stomach has too much to do, and when there is not much energy left for the brain.

Twelve years ago I made a portrait of an Irish gentleman, then the editor and proprietor of our leading Conservative newspaper in Bristol. In a few days after he wrote the very witty article which follows. The library was just as he describes it; indeed, the whole is literally true.

John Beattie.

That a man should live to be fifty, and have a shilling at his command, and yet never had his *carte* executed, is something in this likeness-taking age of ours to wonder at. I was a unique specimen of this kind until a few days ago—a man without his likeness! and I was almost inclined to be proud of my singularity, like poor Colonel Sibthorpe, who was always glorying in the fact that he never entered the Great Exhibition. My friends, however, would not allow me to preserve my distinction; they paid me the compliment of asking me for my *carte*, though I doubt if they would have also paid a shilling for the pleasure of possessing it. My relatives declared they kept niches in their albums open for me, and were impatient to fill the vacancies. Domestic pressure upon me, too, was very severe; and, after years of passive resistance to the pictorial *furore*, I had at last to submit, and allow myself to be led to the photographic altar.

I'll advertise no one gratis, so I shall not say who the artist is that has had the high honour of executing me in a pictorial, not a penal, sense. All studios, I suppose, are the same, so I shall indicate no one in particular by a description, which must be general in its application. What strikes you—certainly what struck me on entering the interior—was that everything was in half there; that is, all those articles of furniture used in the trade—the properties, as a theatrical manager would call them—the objects which are introduced into your picture, and which you select according to your fancy—are in half—half a bookcase, half a console table, half a reading table, half a sofa; half of everything in fact, for no more is needed for your photograph. It is quite the *demi-monde* in this respect. Everything is truncated—cut short, cut in two—in the sunpainter's *atelier*. Whether this is done to save expense or for artistic reasons I cannot say. Each sitter or stander can, so far as furniture goes, select what he likes—have everything, from an arm chair to a miniature Bodleian library, introduced into his *carte*; like the boy in the peep-show, "you pays your money and you takes your choice."

I determined to be literary, and ordered a bookcase, books and all, forgetting that, in making this selection, I must go down to posterity with apparently the same intellectual tastes as a thousand others; for I believe the books had never been changed or moved since they were first placed there. I was curious to see the character of my studies before being, for good and all, identified with them in a *carte*. The first was Swedenborg's mystical work, entitled *Heaven and Hell*, with the name strongly marked in large gold letters on the back;

the next, the *Moral Condition of Ipswich;* then a *Cookery Book*, then *Josephus*, flanked by a work on *Mensuration*. Many others there were, of course, but I forget them; the collection was varied enough—odd, but eclectic. I perhaps might have brought my own books if I had thought of it, so that my literary tastes, like my facial lineaments, might be correctly represented, which I cannot say was exactly the case in the present instance. I might, it is true, have taken some pleasure in the pages of the mystical Swedenborg; but why I should be particularly interested in the moral condition of Ipswich—which I never saw—any more than in numerous other towns I have seen, I did not well understand; that, too, I should be thought by posterity to have had a particular turn for mensuration and cookery was not quite the correct light in which to view my character. For science I have no taste, and to *made* dishes a decided objection, especially in these days, when cattle disease forbids culinary disguises.

There was no help for it, however; there were the books all laid, and I was too lazy to resort to an *index expurgatorius*. I must be content to be supposed given to the same body of reading as many of my betters—the work on the *Moral Condition* of the Suffolk town included. I will get credit for common studies with an accomplished doctor, believed to be very fastidious in his literary tastes, and a few popular parsons, some of them quite as remarkable for their Protestantism as for their personal beauty.

Still, it was amusing to think that a man's literary tastes might very innocently be misrepresented in this way, and I was told of an Evangelical clergyman being unconsciously photographed by the side of a shelf full of Voltaire; while a man who, oddly enough, piqued himself on being a bit of a sceptic, was taken bolt upright near a cabinet library, the first two books of which were *Law's Serious Call* and the *Pilgrim's Progress*.

"Please, don't compress your lips so much, sir; it gives you a stern look!" interposed the artist, as I took my stand on the dais, with my body posed in front of a vertical pole, which seemed like the standard for measuring recruits with. "I can't help it," I said; "I'm thinking of a bad debt." "Then be good enough to find a pleasanter subject for your thoughts while I am taking you," was the reply; and being an agreeable, ingenious man, he began to talk with such tact that I instantly relaxed, and looked as placid as though I never had less for my legal demands than twenty shillings in the pound. The effect—may I be permitted to say—was marvellous. He peeped into the twilight regions of the camera, and cried out with as much ecstacy as if the Apollo Belvidere had suddenly broken upon his view—"Capital, by George! I have you to the life!" He "spoke" of course "by the card," as Hamlet said, and if you doubt his word, you may go and buy me for a shilling at his studio, and uncommonly cheap I am at the money, let me tell you. The first attempt was in a little medallion-shaped form, three on a piece of pasteboard. I was full-faced at top, all repose and philosophic tranquillity; and of the two others, one was with the head down meditatively, and the other looking askant, as though I were cutting a poor relation.

"Now," I said, "let us have the full-length man, pantaloons and boots included;" for I got desperately pictorial and profuse. As it was hard to get me to go and be "photographed," now I was in the studio I determined to revel in likenesses. "In for a penny, in for a pound." But posing myself for a full-length was quite a different thing to *busting* it. It is no easy matter to be at one's ease even under the most favourable circumstances; but stuck up for the occasion, and with a projecting rod from a standard tickling your poll, the feat is peculiarly difficult. Indeed, I was surprised when afterwards I saw my *umbra* (with the aforesaid library to set me off), to perceive how near the natural man I looked considering the distortions I underwent, according to the artist's directions, to adapt myself to his ideal of grace, twisting my body one way and my eyes another.

"The upright man" was the greatest success—the attitude imposing, and the look expressive, without being in the slightest degree suggestive of bad debts or domestic pressure. My only regret now is that I did not begin my series of photographs sooner. Some twenty or five-and-twenty years ago, I believe, the discovery was first made. What a capital idea it would have then been to commence a *collection* of one's self; to trace from year to year the fine diminishing lines of youth—not in idea, but in actual illustration, side by side, *carte* by *carte;* to see yourself under your own eyes shade away and slope off into the sere and yellow period; to see the bloom of twenty-five grow small by degrees and un-beautifully less, until it *greyed* into fifty! What an awful interval between two painted portraits of yourself does a quarter of a century produce!

Why, I have a kit-cat painted some score or more years ago, which was then hung up in an exhibition and pronounced a speaking likeness by a discriminating public. Yet nothing short of my most solemn assurance would convince any one, who now looks at it suspended by my fireside, that "it was ever intended for me;" and, certainly, placing my photograph by it, looking "upon this picture and on that," it is next to impossible to imagine how the same person could ever have been the original for both. But, no doubt, if I had had five-and-twenty photographs "all in a row," one for every year since that half-length likeness was taken, the difficulty of recognition would be greatly lessened on the sliding scale—*facilis descensus Averno*—the drop from the height of manhood to hoar age might be made *comparatively* easy, at least to the imagination. Nay, perhaps the series might have a solemn lesson and preach from their frames something of a sermon to the person whose diminishing life they depicted. Literally, you might say with the orator, reviewing yourself through such a succession, "what *shadows* we are!"

To any of my young readers who now peruse this paper I would say "commence a collection of yourself at once." The idea struck me too late to be carried out, but now that I have begun I mean to go on to the end, though I begin the gallery in my grey hairs. However, I must say nothing to diminish the interest of my present *carte*, which now reposes amongst illustrious company in the ante-room of the artist—a chief magistrate on one hand, a fashionable physician on the other, cathedral canons, popular parsons, and accomplished pianists scattered around me, and all to be had by their admirers so long as the negative lasts for a shilling ahead. Those who *want me* should make an early application. I am fast fading out, and there are only a few left; so that an ultimate advance to eighteenpence appears inevitable. Reader, lose no time—buy at once, "an' you love me," as Jack Falstaff says.

Our Editorial Table.

YORK'S CATALOGUE OF PHOTOGRAPHIC MAGIC LANTERN SLIDES.
London: FREDERICK YORK.

MR. YORK'S comprehensive catalogue assumes a more plethoric form year by year, the present edition being much larger than any of its predecessors. Among the recent additions to the catalogue we find a list of nearly a hundred *Copies of the Best Works of Ancient and Modern Masters*, which embrace pictures by all the leading "masters." Sets of slides to illustrate tales, or lectures of either a scientific or comic character, are also present in great number and variety.

Mr. York has recently added a new and very desirable feature in the production of his slides, viz., the preparation of colours of a description suitable for painting them. After a thorough trial of these pigments we find that their transparence and brilliancy are such as to leave nothing for the most fastidious to desire. Almost any kind of pigments will answer for colouring a photograph upon paper, but for glass painting the number is exceedingly limited, as the most perfect transparency is an indespensable requisite. Hence in selecting such colours as he had done, and presenting them in a form so convenient for the purpose intended, Mr. York has made a large and increasing section of the photographic community his debtors.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on the 3rd October, 1873. The chairwas occupied by Dr. Vogel.

The CHAIRMAN opened the business of the evening by reading several communications from abroad. The only one of these that interest us is that from China, from the Imperial German Customs' Director at Canton—Herr Kleinwächter. In it there is a contradiction to the humorous story of "*Afong*," the Chinese photographer, which went the round of the papers about a year ago. He says that John Chinaman bears a better reputation out there than either the American or English practitioners of the art—a thing that is believable enough, and yet the Chinaman may not be much of an artist.

A discussion then rose as to the Wolfram papers mentioned by Mr. Schöne, of New York, the Chairman remarking that when a very sensitive paper was used for printing it was necessary to have denser negatives, otherwise the results were merely thin, grey blotches.

Herr PRÜMM observed that according to his experience with ammonia-fumigated paper, which possessed great sensitiveness, it was not only liable to this defect but also to yellowing.

The CHAIRMAN said that ammonia fumigation was not necessary when strong baths were employed, but that it was of great use when the bath was weak (say with only five per cent. of silver), or if the paper was subjected to washing after sensitising. The practice was general throughout America, and by its means very brilliant prints were obtained from thin negatives. He himself always made use of the plan if he wished to print from such negatives, or when he used washed paper, or a weak bath, and found it equally servicable in all these cases.

Herr PRÜMM replied that he had a very thin negative taken by Mr. Rocher, of Chicago, which had given admirably-brilliant prints, but which, when he had tried to print here, he could get but indifferent results from, notwithstanding that he used double, and even triple, green glasses to print through. When Mr. Rocher himself tried it in that way he could make nothing of it. The thing puzzled him greatly.

The CHAIRMAN counselled Herr Prümm, instead of using as hitherto a twelve-per-cent. silver bath, to try a five-per-cent., and then to fumigate his paper with ammonia; unless his experience misled him much this would enable him to get brilliant prints.

Herr PRÜMM then proceeded to state his experience with the revised process of burnishing or "satinising" prints. They appear by that means, he thinks, much clearer, and the heavy-looking shadows become transparent; but he did not think that it was quite so useful where pictures had a lightish ground, which were apt to catch a grainy smudginess, especially with "chamois" mounts. He had heated the polished plate with a spirit lamp, and found it of advantage, only the pictures had to be very dry before it could be safely used. With regard to the bubbles in prints which always turn up in winter, he might say that he had not found either the alcohol or ether cure of much real use.

The CHAIRMAN said that the best way to get over that pest was to have fixing baths of varying strength, and to pass the prints from the stronger through the weaker to the weakest, so as gradually to lessen the specific gravity of the solution they were placed in until it approximated to the density of the simple water.

Herr MAROWSKY did not think that a very good plan. It was better to use a weak fixing bath to begin with. True, the fixing then took a longer time, but that did not matter if the prints were saved.

The SECRETARY said that he still got bubbles upon his prints in spite of all the nostrums he had tried. In his opinion it was of great importance that the paper should be kept in a rather damp room.

Herr PRÜMM agreed in that, particularly as the paper was usually received from the albumenisers in such a very dry state. He always put his paper some twenty-four hours before silvering into a tin case having a perforated bottom, and which lay above water.

Dr. VOGEL called the attention of the meeting to Edwards's recent enlarging process, which, it seems, is now being offered for sale in Germany. He said that in reality the pictures were obtained from a fine albumen transparency, from which an enlarged negative was taken in the camera. He gave an outline of the process, and said that he regarded the preparatory coating of the plate with collodion as a superfluity.

Some fine views of Mexico had been forwarded to the Society by Mr. Kilburn, of Littletown, United States.

Herr SCHMIDT, of Kiel, gave his experience in using the albumenised paper of Trapp and Münch. It seems he found it very good to silver on an old bath, but it turned a new one speedily red [most albumenised paper does that we have ever seen]. He had tried to cope with the evil by floating for a very short time on a very strong bath—say thirty seconds on a bath of one to eight—but his prints turned slightly yellow. The redness of the bath was not fully removable by means of permanganate of potash, and required a quarter of an hour's boiling.

Herr PRÜMM stated that Herr Schering recommended boiling even for a new bath in order to remove hurtful substances which, in spite of the utmost carefulness in the preparation of the silver crystals, were very apt to show their presence.

Herr O. LINDNER said that Trapp and Münch warned their customers against the use of permanganate of potash as a bath purifier, and recommended that bicarbonate of potash should be used instead.

Dr. VOGEL did not think that the carbonate of potash was suited for the purpose of cleaning a bath, and pointed out the difference between the single and double carbonates, recommending the single. He, in fact, rejected the use of the double carbonates for photographic purposes altogether.

Herr SCHAARWACHTER had used permanganate of potash for cleaning both negative and positive pictures for a year past with the best results.

Herr BRIQUER said that rose-tinted paper coloured the bath very much less than the ordinary kind.

A conversation then ensued over Herr Herzog's collodion, which were declared by a consensus of opinion to be very sensitive. It was remarked by Herr Schmidt that it had a very camphory smell, and he wondered whether the addition of camphor to the collodion had anything to do with its extreme sensitiveness. It was not clearly made out whether this was so or not, other collodions having the same odour without the same properties.

Dr. Vogel then laid a collection of photographs by Naja, of Venice, before the meeting, and made some remarks thereon.

The SECRETARY doubted, considering what sort of water they must have in Venice, whether the positives could be depended upon as being properly washed.

Dr. VOGEL said that size rather than artistic productions was the aim of the Venetian artists. They made but small use of retouching, and it was also worthy of remembrance that their customers were mostly travellers, here to-day and gone to-morrow, and who cared for nothing so much as some sort of faithful transcript of what they saw around them.

After some further minor matters had been mentioned, the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

AT a meeting of this Society, held on the 4th Nov., Dr. Hornig, the President, occupied the chair.

After the minutes of the last meeting had been read and confirmed the first business was to appoint a committee to decide on the awards of the Voigtlander prizes for the year.

The CHAIRMAN presented to the meeting the latest edition of Dr. Monckhoven's *Manual of Photography*, and pointed out the directions in which this justly-renowned book had been improved. Retouching and carbon printing had, he said, received specially-careful treatment. He hoped the book might be translated into German to increase its usefulness.

Herr FRITZ LUCKHARDT spoke of the great services which had been rendered to the Society by Herr A. Martin during the late Exhibition, and moved that he be requested to come and take part in the deliberations of the Society, and that an address should be voted by the the Society thanking him for his efforts on its behalf.

The motion was carried by acclamation, and a committee was appointed to draw up the address.

A question was found in the *Fragekaster* relative to some very quick-drying varnish which had been sold or recommended at the Exhibition as a necessary part of the American panotype process. The querist wanted to know how to make such a varnish.

Herr OBERNETTER said that a solution of copal in ether would answer the purpose. He remarked that the rapid evaporation of ether conduced to the speedy formation of a hard coating of copal on the surface of the film.

There was nothing else of any importance whatever transacted at the meeting.

Correspondence.

THE GREAT PRINTING PROCESSES OF THE FUTURE.—MEETING OF THE FRENCH PHOTOGRAPHIC SOCIETY.—THE DIRTY WATER PROCESS.—MR. WOODBURY'S GRIEVANCE.

THE meeting of the French Photographic Society on the 4th instant was an unusually interesting one, owing to the great number and variety of specimens of the new printing processes in pigments and fatty inks which were exhibited by different firms. M. Rousselon, manager at MM. Goupil's establishment at Asnières, near Paris, exhibited a large collection of proofs printed from plates engraved by his new heliographic process, which M. Lacan assures us combined all the beauty of silver prints with that of the finest engravings. Copies of pictures, views, and portraits were all reproduced with the same excellence, and we are told that "the last word of photography is therefore found" *(le dernier mot de la photographie est donc trouvé)!* We cannot go beyond this! So much the better, because we may now give our undivided attention to improvements in the *negative* processes. Side by side with these splendid specimens of M. Rousselon's work were placed a series of fine photolithographs by M. Geymet's process, which are said to have held their own; whilst alongside of these again was a grand collection of carbon prints of large size, from the establishment of M. Braun, of Dornach, the technical excellence of which was so perfect as "to defy the most practised eye to discover whether they were from negatives taken direct or printed by a process of enlargement." Thus, says M. Lacan, France has no need to envy either England or Germany as regards the present state of photographic art in these countries, since she has now the means to employ in commerce all the resources which are offered by the permanent printing process, the principle of which is due to the French inventors, Niepce and Poitevin—a remark which is sufficiently near the truth to pass without a comment from me, for even the Woodburytype, of which M. Rousselon's process is a modification, is based upon a property of bichromated gelatine.

Respecting this method of heliographic engraving, it was originally devised by Mr. Woodbury himself, and consisted, according to his suggestion, in roughening the intaglio mould, so as to make it hold printing-ink, by mixing finely-powdered sand with the bichromated gelatine. M. Rousselon, however, improved upon this by substituting for sand a chemical agent which was itself acted on by light in such a way as to produce the degree of roughness required in exact proportion to the depth of the hollows and the intensity of the light. The particular chemical substance employed is a secret which has never been published, but the fact as now stated by me I had direct from himself. A beautiful example of the sand-roughening process was published four years ago by me in the *Photographic Art Journal*—a young girl's head, entitled *Orpheline;* and last year M. Rousselon engraved a plate for me by his new process. It is most gratifying to hear that this method is now capable of producing such fine results; nevertheless in this, as in most other photographic processes nowadays, retouching enters more or less, and is assumed as a necessary part of it.

M. Javel has also started an establishment in Paris for working the Albertype; and M. Fleury Hermagis has been publishing for some months past an album illustrated by a similar process.

Alas for poor silver printing! But, after all, the most that can be said for other methods is that their results are equal to it in artistic beauty—for surpass it in that quality they cannot. Thus silver printing still shows a good fight, and will die game, if die it must.

At the same meeting M. Gobert demonstrated most successfully a method of carbon printing by double transfer, in which the image is first developed upon a copper plate coated with a varnish composed of resinous and fatty matters, and then transferred under water to a sheet of paper coated with coagulated albumen. The trade and amateurs can now be supplied, as before, with pigmented papers for this process at the establishment of the late M. Marion, which is now being carried on by MM. Marion Fils et Grevy.

Some very fine prints in lichtdruck, done by Messrs. Spencer, Sawyer, Bird and Co., were also exhibited, and excited much attention and admiration.

Lastly, some prints were exhibited from moist plates, which I had myself the honour of submitting to the notice of the meeting, and which are favourably spoken of in the Society's *Bulletin*.

M. le Comte Ludovico de Courten, who is now in Florence (always enthusiastically engaged in the practice of our art as an amateur, and who has lately added to our library of treatises and pamphlets concerning it a clever little volume on the tannin process, with a beautiful illustration printed by himself), has just described a source of trouble in working with dry plates which for a time puzzled him greatly, and almost laid him on his beam-ends, for it was quite new to him. The facts are simply these, and my readers will do well to consider them carefully, for, in truth, the way out of this difficulty is the great key to success in working with washed films, whether moist or dry:—

After having been tolerably successful in Switzerland with his first trial of an alkaline developer as applied to dry plates which had been organified with a mixture of coffee and sugar, he prepared a second batch with, as he thought, extraordinary care in every part of the operation, and sallied forth with them full of hope, or rather of *confidence*, in the result. The collodion bromo-iodised, and supplied by his friend, M. de Constant, was the best possible, and not to be suspected of playing any shabby trick; the bath, made of fused nitrate, was irreproachable; the development strictly according to instructions; and everything apparently "all right." Nevertheless, strange to say, not a trace of an image could he obtain upon any one of his exposed plates!—no, not even a trace of the high lights! Was ever heard of so strange a result, and that from quite an old and experienced hand who had just published a book?

So he set to work resolutely, and went over the whole ground again, step by step, until he came to the bottom of the mystery; and where does the reader suppose that lay? In the washing of the plates. The Count had been using what has so often troubled myself on my photographic excursions, viz., the dirty water process. Not water dirty with visible mud, as our Editors once facetiously supposed when I implored them to throw some light, if possible, upon the theory of this trouble, but dirty with carbonates dissolved in excess of carbonic acid, which produced a hard, insensitive layer of carbonate of silver upon the collodion film, which light could not penetrate nor developer affect.

Beware of water containing *chlorides* in the first washing bath. Beware, also, of water containing *organic* matters; but, above all things, beware of water containing *carbonates*, for this is the worst. So writes the Count.

Fortunately for us all, he—who will *not* consent to use distilled water on his travels—has not only discovered the cause of a serious trouble, but has supplied us with a simple remedy for it. This consists in adding a few drops of acetic acid to the washing waters. This sets free the carbonic acid, and makes a soluble acetate with the alkali or earth; after which all goes right.

It occurs to me, however, that *nitric* acid might be better to use for the purpose than acetic, and for this reason:—The soluble acetate in the water, when brought into contact with the free nitrate in the film, might form by double decomposition a soluble nitrate and an insoluble acetate of silver, which *might* not be altogether harmless. Nothing of this kind could occur if nitric acid were used. Of course, the *last* washing water need not contain acid—in fact, it ought not; but, since the greater part of the free nitrate is then removed, the impurities in the water are much less likely to be injurious. It is the *first* washing water which it is most important to have pure.

I have found *organic* matter in this *first* washing bath very injurious with bromo-iodised films, and the way in which I account for the harm it does is this:—

It forms with the free nitrate an organic silver compound in the film, which is insoluble, and, therefore, not removable by the subsequent washings. This organic silver compound remaining for hours in contact with the iodide of silver enters into combination with it, and forms a highly mischievous organic double salt, which produces fog, halation, and all sorts of trouble.

Bromide plates seem to be much less affected by the dirty water treatment than bromo-*iodised* ones, and that for a reason which is obvious enough, if my former remarks be correct.

As for chlorides in the first washing water, these will do but little harm if the plate be kept in motion all the time it remains immersed, and be quickly transferred to the second bath. Two of my very best negatives taken on the 22nd of this month upon moist plates were washed in a first bath which was rich in chloride, and yet no harm was done. I have a much greater dread of organic matter in the washing water, and have now quarrelled most desperately with gutta-percha baths and vessels. In future I am resolved to use nothing but glass.

If any of my readers would like to have any views of Brittany from my own moist-plate negatives my son begs me to say that he will give prints from them in exchange for prints from other subjects of interest. I merely make the offer in order that my readers may see what can really be done by the moist process, which, for my own part, I like better and better every day. The common wet process is very well for *easy* subjects; but for all *difficult* cases give me a *washed* film and a *moist* one. Dry plates are convenient, no doubt, but you must not break your heart over failures, for that problem remains still unsolved by any published method I have yet tried. Why does not some society, or some wealthy amateur, offer a prize for the complete solution of it?

And now I must conclude with begging our Editors to permit me to offer the following remarks in reply to Mr. Woodbury's recent attack upon me:—

I can afford to smile at his polite letter, at page 609, in which he insinuates so broadly that I have run down his process because I am commercially interested in another, since in that very same letter he himself openly commits a similar fault by pointing out a shortcoming in collotype prints. But the fact is, I am *not* commercially interested in *any* printing process, nor have I shares in any company, nor any bias which might tempt me to pervert the truth. I am simply an amateur, experimentalist, and writer; and have hitherto resisted all temptations to mix myself up with the commercial phase of our art, except on a very humble scale. Had it been otherwise I should long ago have given up country life in Jersey, or in Redon, and have made my home in one of the great centres of photographic activity. This must be patent to everyone. What *interest*, then, can I possibly have in running down Mr. Woodbury's process? Clearly none.

But I have *not* run it down; on the contrary, I have been a steady friend to it from the first, and have been more influential than anyone else in establishing the present Woodbury Company in London. One of my oldest photographic friends is a principal in it, and became so entirely on the faith of my representation and advice. This was three or four years ago, and I have not since then said a single word against the process more than I had already published at that time. MM. Goupil made no secret of its shortcomings to me, nor did *they* wish the truth to be concealed. Neither do I suppose would M. Lemercier, who now employs both it and the Albertype. Why should *anyone* wish to conceal the truth? Why should Mr. Woodbury be so exquisitely sensitive at my having told my readers that I have smeared an imperfectly-fixed print by his process? Does he wish it to be supposed that his prints do *not* require to be fixed?

But he may have heard from some one that I have a son who was to have gone to the Heliotype Company to learn their process; and also that I intend to learn lichtdruck myself. But are my son and I entirely to change our present mode of life on that account, and embark in printing on a large scale to the detriment of the Woodbury Company? God forbid! The utmost limit of our ambition is to take a few negatives on our yachting trips, and publish them, if good enough, in a small way, and quite in amateur fashion. At any rate, it is not *my* wish to be beguiled out of my present mode of life by any temptations which commercial photography may have to offer.

In a word, I have no private ends to serve in anything which I may publish in these letters; and I regret that I have been compelled, in self-defence, to enter into this explanation.

But this little controversy will have done good if it has opened the eyes of my readers to these two facts, viz.:—First, that a Woodbury print *may, by chance*, be imperfectly fixed; and, secondly, that a collotype print *may* peel off in patches if printed upon enamelled paper. I do not deny this, and therefore think it a pity that enamelled paper should ever be used in this process. Why not print upon paper which has simply been glazed by rolling it upon a hot plate?

It is not enough for the *material* of a print to be permanent; it should also be permanently fixed to its support. If it crack, or peel off, or can be smeared by the finger, the process is faulty, and I should prefer a silver print. Although these, unfortunately, change colour, yet they will bear otherwise much rough treatment. Nevertheless, water-colour drawings, for which large sums are often paid, will *not* bear the hot-water ordeal; so the question has two sides. At anyrate, beauty, permanency, and no need of mounting may be combined by the collotype process, and a ten-pound note will cover the plant sufficient for the purpose of an amateur. These are merits which cannot be concealed or quibbled away, and, therefore, I mean to learn this process, and I advise my readers to do the same. THOMAS SUTTON, B.A.

Redon, December 27, 1873.

COLLODION.

To the EDITORS.

GENTLEMEN,—Seeing that the authorities appear to be fairly successful in their crusade against *sky-blue* milk (?), I am encouraged to ask the co-operation of all working photographers in an endeavour to put down the present make of sky-blue collodion.

I know that collodion makers (from their advertisements) appear to think their productions unsurpassable, and to be *almost* in the seventh heaven with elation at their deserved success; but, as an operator who has worried through a fair amount of their productions, I have sometimes taken the liberty of wishing they really *were* there.

Will the aforesaid makers allow me to suggest that by kindly putting some body *in* the collodion they will greatly aid photographers in their endeavours to put somebody—anybody, in fact—*on* it, and with much more satisfactory results than can be at present obtained?

I think it is within the experience of every photographer that much pluckier and brighter negatives can be obtained with the *thick* bottoms of collodion than can be produced with the first portion of a bottle. But thickness is not all that collodion requires; it ought to possess that spongy toughness that used to characterise good positive collodion, so that when sensitised it looks like a young washleather on the glass, and by its opacity *uses* instead of *transmits* light, as the present skinny abominations do.

I think fully as much depends upon the mechanical quality of a film as upon the nature of the sensitising salts; and that when success crowns a dry process it is mainly owing to the powdery cotton used. I am quite unable to see why the same valuable property should not be utilised in the wet process.—I am, yours, &c., J. COOPER.

23, *Gloucester-place, Cheltenham, December* 27, 1873.

[The difference between the thick "bottoms" of collodion and the first portion poured from the bottle consists in the former having got rid of the large proportion of its ether and alcohol, with a relative increase in the proportion of salting material. Some give a "body" to their collodion by removing the stopper from the bottle for a short time; but this is a wasteful and unphilosophic method of procedure. The best way to proceed is to thicken the collodion by the addition of either very thick collodion from a stock bottle or of a few grains of pyroxyline, accompanying this addition with sufficient iodides and bromides to give it the requisite degree of opacity; but, as collodion of this kind would speedily become too thick for use, it will be necessary to thin it as it nears the bottom of the bottle.—EDS.]

HINTS TO BEGINNERS.

To the EDITORS.

GENTLEMEN,—I see in your number for November 28th an article on *Washing Prints*, and as I can endorse the correctness of that article, I trouble you with the following remarks, trusting they may be useful to amateurs like myself:—

In the outset, I never washed a print more than three hours—the average being from two to two and a-half hours—for the last four years, and I have prints four and five years old as good as when first finished.

I have a tin tray about five feet six inches long, eleven inches wide, and one and a-quarter inch deep, the low end being one inch deep to allow the water to flow off.

This apparatus I suspend in a bath immediately under the hot and cold taps, suspending it as nearly level as possible. I tone with—

Carbonate of soda	8 grains,
Distilled water	10 ounces,
Gold	2 grains,

this being made about half-an-hour or so before use. I fix with four ounces of hyposulphite of soda to twenty-five ounces of common water. I tone for five minutes with the first prints, and allow a little more time with the others. I fix for five or six minutes, but never so long as ten.

When fixed, each print is washed in a dish of water by drawing it gently through with the finger and thumb of each hand, to remove the excess of soda. I then place it in a dish of clean water, which I change two or three times till all my prints are fixed, when I take them into the bath-room and place them in the washing tray face upwards, and each print separate. I then turn on the cold tap slightly, the tray being previously filled—in fact, just sufficient to keep a gentle flow of water through the tray. After a quarter of an hour or so I move all the prints about to disperse air-bubbles which accumulate under the paper and adhere to it. I usually go away for two hours, leaving the prints to take care of themselves. I then turn on the hot tap and raise the temperature to 70° or 75°, move the prints about in it for ten minutes or so, then take them out and dry the surplus moisture off with clean white blotting-paper, and lay them on a table to dry.

I have some pieces of glass an inch square, cut out of the ordinary patent plate, which act as weights whilst the prints are being washed; by placing one on the corner of each print, so that it lies only on three-eighths of an inch of the paper, it keeps the print from floating and allows the water to flow on both sides.

I give this sketch on account of the uncertainty of young amateurs as to the length of time prints should be washed. It is necessary a print should be thoroughly fixed, but I believe over-fixing is as bad as excessive washing.

In both toning and fixing I never allow two prints to be in the bath together so as to lie over each other (I am speaking of 10 × 8 plates), and also in the final washing each one lies on a separate area.

Finally: I guess at nothing, weigh and measure everything, and then I know I am working under the same conditions always—a hint that may be useful to the young photographer.

Sometimes I have removed the print from toning direct into fixing, allowing the gold excess to drop off the paper for the same length of time as coating a plate, and there are no signs of fading. I believe the chemical condition of the water used in washing has something to do with it, especially if that process be excessively long—say from twelve to twenty-four hours.—I am, yours, &c. NORTHERN AMATEUR.

Newcastle-on-Tyne, December 29, 1873.

LIME-LIGHT QUERIES.

To the EDITORS.

GENTLEMEN,—I should be glad of your opinion on the following matter respecting equality of pressure on gas bags:—

I use the bags one on the top of the other. I have a *tap* dissolver, and consequently use nearly twice as much hydrogen as oxygen; the hydrogen is, of course, the common coal gas (carburetted hydrogen). I fill the hydrogen bag as tight as I can get it; the oxygen not quite full—that is, not *tight*. At the conclusion of the entertainment the hydrogen is nearly all exhausted, whilst the oxygen bag is only half empty. Under these circumstances how is it possible to keep *equality of pressure?* The relative number of cubic inches in each bag is continually altering.

Does it do any harm to gas bags to *warm* them before the fire when they are stiff? The books all say "put them into a warm room," but this plan would be very tedious; in fact, I have found it almost impossible to get them *pliable* this way.—I am, yours, &c.,

Derby, December 30, 1873. W. S.

[Although from the larger orifice of the hydrogen jet the quantity of gas emitted is greater than that of oxygen, yet, from the fact of one bag being placed on the top of the other, both will be subjected to the same degree of pressure. This arrangement of the gas bags is, we may say, one of the safest and best. For reducing a hard gas bag to a state of pliancy the best way is to hold it about four feet from a good fire, frequently changing its position. In this way it will become quite soft in a very brief period of time.—EDS.]

CONCEALED SHUTTERS FOR CAMERAS.

To the EDITORS.

GENTLEMEN,—One of the greatest difficulties of the photographic art is the successful taking of children's portraits. Nearly every artist knows that a child's attention is attracted by the most trivial circumstance—so much so, that the removal of the cap from the camera lens is quite sufficient to prevent anything like a successful result.

I beg to submit to your readers a plan I have adopted, by which the lens cap will not be needed, so that when the attitude, expression, and general position of the subject are all favourable they need not be disturbed by any perceptible effort of the operator. To explain my system I enclose four photographs of the contrivance. One of these represents the inside of a box supplied with a shutter sliding between vertical guides, and drawn down by means of elastic. On the bottom there is a strip of wood which keeps the camera at a proper distance from the shutter. Another photograph shows the camera in its place with focussing-cloth thrown back to expose camera and box when ready for use. To the shutter is attached a string passing through the crosspiece on the pillar which, when pulled, opens the shutter for exposure. The advantages, therefore, are that when the attention of the sitter is favourably engaged for a good portrait no apparent effort of the artist is noticeable.

For the last six months I have adopted the plan described with the most satisfactory results, obviating, as it does, the formal and often unnatural attitude and expression which so often characterises the visible manipulations of the photographer. The uncapping of the lens is not needed; the sitter is unconscious of any movement of the artist, who seizes upon the most favourable moment for his purpose.

Should the above-described plan prove of benefit to my brethren of the photographic art it is quite at their service, and I should feel the greatest satisfaction in learning that it has been successfully employed. I read with pleasure any improvements your Journal suggests, and shall be always glad to assist in any way I can the advancement of the profession.—I am, yours, &c., SAMUEL CARNELL.

Napier, New Zealand,
October 20, 1873.

[We may here take occasion to state that in our forthcoming ALMANAC several excellent instantaneous and concealed shutters will be described.—EDS.]

THE FIRST OXYHYDROGEN ACCIDENT OF THE SEASON.

To the EDITORS.

GENTLEMEN,—Allow me to call your attention to an account which appeared in *The Times* of December 25th of a gas explosion in a theatre?

"At the Liverpool Amphitheatre, last night, a fearful explosion of gas occurred behind the scenes midway in the pantomime, being performed for the first time. The audience rose in alarm, the whole dramatic company rushed in terror across the stage, the theatre was filled with clouds of white dust like smoke, and a panic seized the assembly, everybody rushing towards the door for a time. The scene was terrific, as everybody thought the place was on fire, which was, indeed, the case, and as 200 children were taking part in the pantomime their screams and terror increased the confusion. The lessee, Mr. Leslie, made his voice heard above the roar, shouting an assurance that there had been an explosion of gas, but nobody was hurt. Two bags, containing compressed gas for the lime light, had burst in the flies, blowing three men some distance with great force, knocking boards on actors below, filling the house with dust, and setting fire to some scenic properties. The men recovering seized water buckets, and with great exertion extinguished the flames. The performance was ultimately resumed under difficulties."

Query—What caused it?—I am, yours, &c., SYNTAX.

[It is impossible that "compressed gas," as we now understand the term, could have been used in *bags*, although it has doubtless been under pressure. If the bags contained pure oxygen no explosion would have taken place, nor could it have occurred with hydrogen bags. What is probable is that the oxygen was contaminated with some other gas which imparted explosive properties to it. This may have been caused by using impure oxide of manganese, which has several times caused serious explosions. We have known of a little oil in the screw of the retort neck, a little coal dust among the manganese, or other foreign matter—not added for the sake of *adulterating* the manganese, but accidentally—produce results of a serious character. If hydrogen and oxygen bags be unequally weighted there is a chance of gas passing from that under most pressure to the other, and this at once supplies the requisite conditions for an explosion.—EDS.]

THE SILBER LAMP.

To the EDITORS.

GENTLEMEN,—A serious explosion which has recently taken place at Liverpool, during the performance of a pantomime at a theatre in that town in which the lime light was utilised, induces me to inquire whether there are no means of obtaining a powerful, steady, and intense light by the combustion of mineral oil?

I have heard much about the Silber lamp. It is said to give a light which, if inferior to the lime light, is yet superior to that emitted by any other existing form of lamp; and it occurs to me that in the Silber lamp we might look for something to displace oxyhydrogen, with all its troubles and dangers.

As the subject of artificial lights has always been a congenial one with the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, I may venture to suggest that a descriptive and critical account of the Silber lamp would be much prized by its readers, the more especially if its capabilities for the production of enlargements and its adaptability for the magic lantern be treated of.—I am, yours, &c.,

December 31, 1873. H. E. THOMPSON, M.D.

[It so happens that we have for some time had it in contemplation to devote an article to this subject; and, as Dr. Thompson is only one of several correspondents who have preferred a similar request, we purpose having something to say about the silber lamp in an early number—probably next week.—EDS.]

ANSWERS TO CORRESPONDENTS.

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

PHILO.—If you give the cistern three coats of very thin paint, allowing each to be thoroughly dry before applying the other, the desired end will be accomplished.

S. T.—Although the paper appears to be quite good it is impossible for us to pronounce a decided opinion upon its merits without trying it, and this we have no leisure to do at present.

QUERIST.—The formula for ground glass varnish given in our last was in reply to a query, and was intended to take its place among our "Answers to Correspondents." The Mr. Hughes referred to was Mr. Alfred Hughes, of Ryde.

G. G.—The wire corners are the cause of the stains. Instead of being made of silver, they are in reality formed of *German* silver, which is a compound of nickel and copper; hence the reduction of silver at the margins of your negatives.

GEORGE J. SMITH.—Remove the lens from its cell, and place it in lukewarm water until its becomes warmed throughout, afterwards removing it to still hotter water. This will soften the balsam, so as to enable you to separate the components.

C. A. FERNELEY.—The print proves that you have successfully mastered the double transfer process. The tone would be more agreeable if it were a little warmer; but this, of course, is a matter over which you cannot exercise control. Thanks for the kind expressions conveyed in your letter.

G. V. B.—Untoned patches on prints are likely to be caused by the prints being placed in the toning bath without taking proper precautions to keep them separated. Whenever two prints get into collision and remain in that state it stands to reason that the action of the toning solution will cease, from the inability of the latter to obtain access to the print. The remedy is obvious.

AMATEUR (Kerry).—1. To convert nitrate of silver into the oxide add a solution of caustic potash; a black precipitate will fall, which is the oxide in question. It is washed by repeated additions of water. Carbonate of silver is formed in a similar way, substituting bicarbonate of soda for caustic potash. In dissolving either the oxide or the carbonate, use no more of the solvent than is absolutely necessary.—2. Nelson's opaque gelatine is very well adapted for emulsions.

CLERICUS (Manchester).—The cause of the quinine not dissolving is very easily explained. Sulphate of quinine does not dissolve in water unless there be a large proportion of acid present. Proceed in the following way:—Add two or three drachms of water to the quinine, and then drop into this some sulphuric acid, stirring with a glass rod after each addition. In a very brief period of time the quinine will have been dissolved, the liquid being quite clear. The acid should be added by single drops at a time.

MIDSHIPMAN.—The production of the raised blocks for typographic printing to which reference was made has never been published; but a method equally good has been described by us in this Journal which, in brief, consists of exposing a film of bichromated gelatine under a negative, placing it in water till the printing presents a sunken appearance through the swelling of the surrounding portions, and then obtaining a cast from the gelatine. The intimate acquaintance you possess with the processes of stereotyping and electrotyping renders it unnecessary that we should go further into detail.

MAJOR B. B.—Light may be easily polarised by means of a bundle of nine or ten plates of glass made quite clean. They should be placed at an angle of 56° towards the light, by which the beam that falls upon the glasses will be polarised, one half being transmitted and the other half reflected, but both being polarised. Polarised light may be employed not merely as an agent for producing and exhibiting phenomena of a most sensational character, but also as a means of chemical analysis of a certain kind. It is not many weeks since we recorded the discovery of crystals of gallic acid upon a dry plate by its agency, thus obtaining a clue to an obscure cause of failure of certain dry plates.

MAORI.—1. For taking *carte* landscapes a single stereoscopic landscape lens will answer every purpose. If a portrait lens be employed see that a small stop is used with it.—2. We cannot assign any reason for the apathy with which photographers regard the old glycerine process, unless it be that they find that processes of more modern introduction answer their purpose better. —3. We have seen several good negatives produced by Mr. Sutton's moist process.—4. Plates may be developed by the alkaline method with quite as much certainty as by acid pyro, but it is best adapted for films containing bromide of silver.—5. We shall be happy to be of use in aiding you in the selection of any kind of apparatus.

RECEIVED.—R. Manners Gordon; J. Gough; Payne and Chapman; A. J. Simpson (Casino); and Geo. Patterson.

OUR ALMANAC.

IT will be seen by the announcement in our advertising pages that the ALMANAC will be published on SATURDAY, the 10th inst. The forthcoming work will be the most comprehensive annual volume ever published in connection with photographic art-science.

METEOROLOGICAL REPORT,

For the Week ending December 31, 1873.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain fall.
26	30·16	SW	43	46	48	40	—
27	29·83	N	40	41	42	40	0·16
29	30·11	SW	—	30	41	27	0·04
30	29·95	SW	33	35	49	28	—
31	29·54	SW	48	49	50	33	0.08

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 714. Vol. XXI.—JANUARY 9, 1874.

COLLODIO-BROMIDE EMULSIONS.

At a recent sitting of the Photographic Society of France a paper was read by M. Buyron upon a new mode of preparing a collodio-bromide emulsion, which deserves, at all events, a passing remark. The proposed method is certainly a somewhat complicated one, and, therefore, unless some great benefit is to be obtained by the procedure, is not likely to be much adopted.

After dissolving the bromide of cadmium and a certain proportion of gun-cotton in a mixture of alcohol and ether, the clear fluid, after a subsidence of a week, is decanted and placed in a wide-mouthed flask, and the whole of the solvent evaporated by heat with constant motion, so as to avoid the formation of any pellicle or film on the surface of the fluid until it has become dry.

Then, again: a quantity of nitrate silver, corresponding to the amount of bromide of cadmium, is dissolved in a certain proportion of alcohol, and the jelly obtained by the evaporation of the first solution placed therein and allowed to remain for some days till the whole of the decomposition of the salts has been completed, when the alcohol is decanted and replaced with a similar quantity of fresh spirit, which, in its turn, is also poured off. This "sensitive jelly" is then dissolved in plain collodion, and the preparation is ready.

Now, we cannot avoid thinking that this mode of procedure is radically wrong. It is well known that the more dilute the solutions are which are employed for the production of a precipitate the more finely divided are the particles of the precipitated body, and, therefore, the more likely to remain in suspension in a medium of sufficient density. In the present case the formation of the bromide of silver is set about with the bromide in the most concentrated condition, certainly surrounded by a dry or nearly horny envelope, but still, we think, not under circumstances well calculated to obtain the resulting bromide of silver in the finest state of division.

No details as to the practical results obtained seem to have been presented to the Society, and the matter appears to have been offered as a suggestion, with the expressed hope that members of the Society more fortunate than the author in having leisure should take up the question and continue to experiment upon it.

We have no means of knowing whether M. Buyron, the author, is acknowledged as a chemist as well as a photographer; but in the interest of our art we think that it is undesirable that papers of this kind should be accepted by a scientific society, and thus stamped with a sort of authority which is not backed by, at least, practical evidence that they contain more than mere theory on the subjects upon which they treat.

PATENTED INVENTIONS.

No. I.—BURNT-IN PHOTOGRAPHS.

We purpose giving a short series of articles, descriptive and critical, on some of the inventions in photography which have received protection by patent during the past year. Our descriptions shall be as lucid as we can possibly make them, and our criticisms characterised by the utmost fairness and impartiality.

The invention which falls first under our notice is one on *Burnt-in Photographs;* and, as every attentive reader of this Journal knows by this time that a patentee in claiming protection for his inventions must, as we recently said, "make a clean breast of it," we have no doubt that many will read this article with the avidity we displayed when subjecting the specification of the patent to a careful perusal; for we are quite aware that everything which can be published connected with photo-enamelling or any other phase of burnt-in photography will prove interesting.

The patentees of the invention about to be described are Messrs. Billups and Lee, of Cardiff, and their inventions are described in two separate specifications for which the Great Seal was obtained in October last. These we shall take in their order.

The first patent has been obtained for making transparencies upon glass, and putting such glass into a muffle or furnace so as to burn the photograph into the glass. This, however, is not all, for the patentees also claim the colouring of these burnt-in photographs on glass or enamel. At this stage, however, we imagine our readers are desirous of being made acquainted with the details of the methods employed in effecting these objects. We comply by giving the specification in the words of the patentees:—

"The object of our said invention is to obtain permanent pictures or delineations from those taken by the photographic process, so that, notwithstanding the tendency of the same to become in the course of time obliterated by the agencies which produce that result, the picture or delineation shall be preserved in its pristine appearance. Or we obtain by the same means the like result with photographs produced on glass direct. We effect the above results by transferring photographic pictures or delineations on to glass, and (by the process hereinafter described) permanently fixing the same therein or thereon, or by treating as hereafter described photographic pictures or delineations produced on the glass direct. Thus far we have described the object of the invention and its nature; now, therefore, in compliance with the said condition in the aforesaid Letters Patent contained, we will particularly describe and ascertain in what manner the same is to be performed or carried out in practice, that is to say:—

"These improved permanent photographic pictures or delineations are produced in the following manner, namely:—We produce permanent photographic pictures or delineations on glass by transference or by producing a photographic transparency on the surface of the glass, and we render the same permanent by placing the glass with photograph thereon in a furnace or muffle and firing the same until the photograph is permanently burnt into the substance of the glass. We can colour such pictures or delineations on glass, and likewise can obtain coloured photographs in enamel, in which the colours are rendered permanent by incorporating the colours with the substance of the photographs previously burnt into the enamel tablet or glass, and therefore forming part of same, by similar means; that is, we apply vitrifiable colours mixed with water or any other medium or otherwise by a brush or other convenient means, and we then place the glass enamels so treated in a furnace and fire the same until the colours are thoroughly fused into the material of the glass or tablet.

"Having now particularly described and ascertained the nature and object of the said invention, and in what manner the same is to be performed or carried out in practice, we hereby declare that we claim the invention of *Improved Permanent Coloured and other Photographic Pictures and Delineations* as the same is hereinbefore described."

Now, at this point we feel compelled to make an observation. Messrs. Billups and Lee have in this patent shown that they are not intimately conversant with either current photographic literature or the past history of photography; if they were, they would have been well aware that what they designate their "invention" has not merely been invented long since—certainly so far back as 1854—but it has formed the subject of *numerous* articles in this Journal during a period of many years. Large businesses depend upon this invention, and public instruction in its details has for a considerable time placed it at the disposal of all who, for a small pecuniary outlay, have cared to avail themselves of the means thus placed within their reach.

But, perhaps, it will be said that the patentees may employ some method not previously published. This brings us to the second head of our observations.

The patentees have not in the foregoing specification described *in full detail*, nor, for that matter, have they attempted any description at all of the means they employ to produce their "improved photographic pictures." They merely say, We produce so-and-so, or We can colour such pictures, &c., being apparently ignorant of the fact that, in drawing up the specification for a patent, it is absolutely necessary that such a full and detailed description of the thing patented be given as to enable any person of ordinary intelligence to produce that for which protection has been afforded. Therefore, to tell photographers, as the patentees do in the concluding paragraph of their specification, that they have "particularly described" the nature and object of their invention is to display an amount of *courage* that few readers of the serial literature of photography would lay claim to.

But we pass now to the second patent of Messrs. Billups and Lee. As it is dated only ten days subsequent to the first one, we conclude that it is a kind of afterthought, embodying some important feature omitted from the previous patent. Nor are we mistaken. The former invention had reference mainly to the burning-in of photographs upon glass, although enamels were also hinted at; this, however, is an extension of the burning-in system to porcelain and fictile ware. The expressed object of *this* invention is to produce "permanent coloured and other photographic pictures, delineations, and devices on articles of porcelain or other fictile ware in such manner that the same may not be subject to fade away or lose their distinctness." And this object is stated by the patentees to be carried out by them in the manner and by the means hereafter stated, which we will give in their own language:—

"We produce permanent photographs on articles of porcelain and fictile ware by transferring to or producing a photographic transparency on the surface of the porcelain and fictile ware, and by placing same with the photograph so transferred to or produced thereon in a furnace, and firing until the photograph is permanently burnt into the substance. Permanent coloured photographs on porcelain and fictile ware can be produced in a similar manner; that is, we apply with a brush or by other convenient means to the porcelain or fictile ware (with photograph thereon) vitrifiable colours, and then we place the same in a furnace and fire until the colours are thoroughly fired into the material.

"Having now particularly described and ascertained the nature and object of our invention, and in what manner the same is to be performed or carried out in practice, we hereby declare that we claim the invention of *Improvements in Producing Permanent Coloured and other Photographic Pictures, Delineations, or Devices, on Porcelain and other Fictile Ware*, as hereinbefore set forth and described."

Still, as in the former case, all details respecting the method by which these very desirable ends are sought to be accomplished are withheld—either intentionally, so as to prevent the public from doing so; inadvertently, from the patentees not thinking that it was necessary to give details; or, possibly, from their not having their invention in such a state of completion as to warrant them in saying in what way they could carry out practically the objects of their invention. What it concerns us to know at present is that the details have *not* been given.

Our concluding observations may be brief. First: If it be necessary that in order to a patent being valid the thing patented be new, then this patent must fail for the reasons given in a former part of this article. What has been specially claimed is *not* new. Secondly: if it be necessary to a valid patent that the thing claimed be not only new, but must also be so fully described as to enable a person of average intelligence to carry out the invention from the description given, then on this ground we fear that the patent would not for a moment be able to "hold its own," inasmuch as *no* "description," in the technical sense of the term, has been given by the patentees.

We observe in Mr. Sutton's letter this week a suggestion regarding the probable benefits to be derived from the cementing of the back lenses of a portrait combination instead of having them separated, as they are at present. All old daguerreotypists are aware that in the early days of the art Voigtlander made a great number of portrait lenses of exceedingly short foci—so much so that a combination the front lens of which was three and a-quarter inches in diameter had a back focus of only two inches or thereabouts. A noticeable feature in this rapid combination consisted in the back lens being smaller in diameter than the front, their relative dimensions being three and a-quarter and two and a-half inches. This peculiarity is observable at the first glance; but what is not generally known is the fact that the back combination is cemented the same as the front. The advantage sought to be attained by this cementation was an increased amount of light and greater brilliancy of the image, owing to the suppression of the interior reflecting surfaces. It was afterwards found that greater flatness of field and better correction generally were obtained by having the inner surfaces of the back combination of different radii, which, of course, precluded the possibility of cement being used; and this principle continues to be adhered to—at anyrate in the case of portrait lenses, ordinarily so-called.

In one of our late numbers an abridged report appeared of a paper read before the Chemical Society on the influence of metallic deposits upon zinc in the presence of various acids and alkalies, the author, Mr. C. Gourdon, suggesting that the action set up energetically by the presence of the minute metallic deposit might be rendered available for the production of heliographic plates. It would appear that a zinc plate, partly covered with a fine metallic coating of gold or platinum, is energetically acted upon in the coated portions by acids so dilute that, under ordinary circumstances, they would have no effect whatever upon the metal. This property is likely to be very useful in the manufacture of plates for block printing, and it might readily be applied by impressing upon the surface of a zinc plate a design in transfer ink or printers' greasy ink, and then, by depositing a thin gold or platinum film upon the plate in the plain proportions of the design, etching the coated portions by the action of a very dilute acid. This would probably furnish a block suitable for printing without "undercutting" the lines of the design, as is invariably the case when a strong acid is employed to etch the surface of such a plate. This opens up a field for experiment which cannot fail to be fruitful in results; for a ready means of preparing printing blocks from the designs produced by photography would be embraced as a boon by publishers for book illustration to an extent which, we believe, would be virtually without limit. We propose to make a few experiments ourselves in this direction, when we shall recur to the subject, and report more fully upon it.

FURTHER NOTES ON THE "HOWARD TENT."

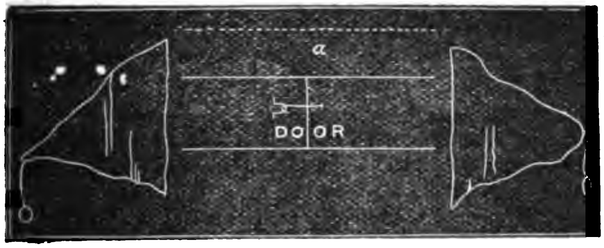
I have been asked for further particulars of the working of the wet process in the field with the aid of the "Howard tent." A second inquiry has also been made as to where it can be purchased.

As the latter question is so easily answered I may here mention that I know of but one establishment where the tent can at present be obtained—that of Messrs. Lee and Co., india-rubber dealers, Holborn, London, who are the manufacturers of it. The peculiarity of the construction of the tent requires that the manufacturer shall see the actual article rather than work from a drawing or description of it.

My own tent is comprised of a double thickness of india-rubber cloth, and I have added an extra thickness to the yellow window—a piece of orange French merino. I am not a convert to the theory of white light shortening the exposure, so I take every precaution for stopping it out. This rather puzzled me at first, owing to the cloth door (with its cloth dressings) being too pliable.

I tried two or three ingenious devices, each of which succeeded in a manner satisfactory after a fashion; but the time consumed was great, considering how often it was required to be opened and closed before the negative was ready to see daylight. The annexed diagram will show the additions I have made, and the advantage of them.

On referring to the door it will be seen that it is shown with a line down the centre. This represents it, in architectural *parlance*,



"hung folding"—that is, in two parts—and secured with a strong hook and eye. The line below *a* is what would be the head of the door opening, having a wire pushed into a covering in a similar way that a running string would be in a cloth garment. This acts as a stretcher, is always in position, easily removed by the hook at the end, and weighs but an ounce or two. The dotted line above *a* is a curtain falling over the door, and part of the tent as I purchased it; but the wings shown at the side are additions which shut out light, preventing its creeping in horizontally. Pieces of elastic at the ends—one with a hook and one with an eye—will explain how it is fastened.

This description may seem to involve a large amount of doing and undoing, but in work the door is as easily closed and fastened as that of the ordinary dark room.

The tent being fixed, and the wire pushed in, after collodionising the plate and dipping it in the bath, hook the door to fastenings (elastic), drop the curtain down, fasten the hook and eye together on the outer wing, and all is as complete as could be desired.

To any one adding the wire arrangement to the tent I may here describe the easy way in which I accomplish that piece of handicraft:—Take a piece of india-rubber cloth the length of the door and an inch wide. Coat the edges with india-rubber solution (that sold at the shops—not the home-made article), bend it over the wire, and apply it in position—one edge on the outer, the other on the inner side of the "wall" of the tent. Take a warm, flat iron and press it closely; it dries immediately by this means. The wire will fit extremely tight (if you like to make it so); but if it be drawn in and out a few times it will work easily. Any one performing this operation for himself will see the necessity for inserting a piece of board, or something of the sort, to form an even surface upon which to use the flat iron.

I would also suggest to the makers of this unique dark room that if not so tapering at the top end it would allow a larger plate to be handled with greater ease. If my tent were the width of the tripod stand, where it joins on to it, I believe I should then be able to collodionise an 8 × 10 plate, and develope it after exposure.

I find the developer of Mr. B. J. Edwards about as near to perfection as any formula I have tried. Mr. Howard, I believe, uses a little water to wash off the developer. One day, as I was working on the edge of a stream, this plan was tried. The negatives turned yellow when exposed to light, while those flooded with acid and water remained perfect.

J. W. Gough.

THE NEW LIME BALL.

From The British Journal of Photography I see the lime ball which I invented has initiated some little discussion on its merits, and caused the hope also to be expressed that it would ultimately prove successful.

Experiment, followed by discussion and expression of opinion, is the only way to bring out its merits and defects, by showing what requires to be improved and what is already perfect, so that I hope there will be still further trials and further expressions of opinion in the Journal and otherwise.

Since first introducing them I have changed, or, at least, modified, both the formula for the balls and the way in which I manipulate them, so as to avoid the defects which, quite apparently to myself, were inherent in both the theoretical and practical part of the original process.

I used at first the fine carbonate of lime, under the impression that it would yield a more uniform mass, and therefore less likely to split under the heat than the coarser-prepared chalk, and with the further idea, also, that the finer preparation and finer ball gave a better light. After many experiments I believe I am mistaken.

Making the balls now with the ordinary prepared chalk I find, after numerous trials, that I have not only as good a light, but also a very superior ball, it being harder and more dense, as can well be understood, whilst in all my experiments I have not had one ball that has split with me. They now pit very little—certainly not more than the ordinary ball—and they have frequently done duty twice over with me. I do not wish, however, to uphold them on this last merit. They do well if they do duty once; and all I claim for them (and, after all, it is the one grand feature) is that they are balls which will keep under exposure for any number of months or years, and at the end be as good as at first.

As to the manipulation of them, I mass them as formerly; but I now put the paste into moulds, thus giving them a more symmetrical appearance than before, and also preventing cracks in drying.

In the whole process, I need scarcely say, there are little niceties to be observed which can only be gained by experience, but which need prevent no obstacle to their being manufactured by anyone.

I send you along with this one or two balls for the purpose of showing to those interested, and, further, I will be glad to hear from anyone regarding them, through the Journal or otherwise, as convenient.

Wm. Gilmour.

PROCESS FOR PRINTING ON WOOD OR CANVAS.

Mr. T. C. Roche contributes to *Anthony's Photographic Bulletin* the following formula, which, he says, will be found useful to wood engravers, or to those who are photographing on wood. To prepare the block for the sensitive coating, make a thin solution of gelatine, six grains to the ounce of water, mixed with some gilders' white. Coat the surface of the block with this, using a wide camel's-hair brush, and, when dry, brush over the prepared surface in the dark room some of the following solution:—

1.	Red prussiate of potash	120 grains.
	Water	2 ounces.
2.	Ammonia-citrate of iron	140 grains.
	Water	2 ounces.

When dissolved mix together and filter. This solution should be kept in the dark. When the coating has dried expose under a negative in sunshine for ten or twelve minutes; then take the block where the light is not very strong, wash the surface lightly with a soft sponge in water, and a beautiful dark blue picture will appear that will not chip in cutting.

To make a red picture prepare as above, but use the following mixture:—Dissolve twenty or thirty grains of sulphate of uranium in one ounce of thin gum arabic or gelatine water, and brush this on the block or canvas in the dark room. When dry, expose under a negative for ten to twenty minutes in sunshine; then wash well with a sponge and water. Now take a clean sponge charged with a solution of red prussiate of potash, twenty grains to the ounce of water, and apply it quickly all over the surface, and the picture will appear immediately. When all details are out wash clean with a fresh sponge and water. A drop or two of muriatic acid in some water will bleach the picture if over-printed.

PHOTOGRAPHIC NOTES ON ALGERIA.

Having been in Algiers a few months ago my recollection of the place from a photographic point of view may possibly be useful to fill up an odd corner.

The appearance of Algiers from the sea would form one of the finest views to be found anywhere. A large picture containing the extreme east of the city, or, perhaps, the Fort de l'Empereur, on the hill above, where Abd-el-Kader capitulated, after it was blown up, the white city itself with its flat-roofed houses rising with a tolerably rapid ascent to the Casbah at the top, in the centre, and continued westward to the road to St. Eugene, would present many beautiful features. Such a picture could be taken from the end of the jetty at the Musoire du Nord, and would include some shipping as well. There are also some most beautiful bits to be found at Mustapha Superieure among the many villa residences seated in their shady nooks amid tropical scenery—plantains, bananas, date trees, &c. Mustapha Infereure, also on the sea-shore, or near it, has many things worth having—among others the Café of Hammah, patronised solely by natives, which is situated under some noble plane trees, exactly opposite the entrance to the Jardin d'Essai. This café, with the Arabs, Spahis, Moors, Kabyles, &c., in their native dresses, squatted round about drinking their little cups of coffee, or asleep on benches, would make a capital picture. The Arabs are good sitters, and very good-natured over it.

The Jardin d'Essai, which stretches from this down to the sea-shore and contains about 150 acres, offers almost any number of sketches of tropical and sub-tropical foliage, with occasional glimpses of ostriches and some small lakes. On the St. Eugene-road, to the west of the city, there are many villas nestling among rare shrubs and trees. Right above St. Eugene, at a very considerable height, stands a new Catholic church, Notre Dame d'Afrique, a most prominent feature on that side of Algiers. This could be included in a fine sea view taken from the intrenchments on the west. In the principal cemetery, on the St. Eugene-road, is also a profusion of lovely flowers, if any photographer have a taste in that direction.

The city itself, Algiers, has many points of photographic interest. The front of the sea presents a splendid boulevard, built by Sir Morton-Peto, which can be equalled only in Paris, if there. The rising gradients from the wharves below, form a fine feature. The Place du Government, about the centre of the city, on the sea-shore, has on one side a short promenade under date trees, and on another side the old Mosque. A picture of the interior of the latter, with its mimbar or pulpit in the centre, would be worth having.

There is also another *mosque* (accented by the Moors on the last syllable "que") just above the garden of Marengo, which is smaller, but presents somewhat more artistic features. It is, perhaps, not requisite for me to say that all visitors to the mosques are expected to take off their shoes on entering. I always did this, and found that my recognition thus of their holy places was appreciated by the Moors. The old Moorish houses in the city, with their square central courts and flowers and flat roofs; their narrow streets, seldom more than five or six feet in width, and always steep; the caves or workshops, without windows, with the Moors at work on slippers or horn-work; the fine, rich dresses of the various peoples, their robes, turbans, sashes, &c., present altogether innumerable points of interest to a photographer.

Up the country there is nothing special, if we except the orange groves of Blidah at the foot of the lesser Atlas Mountains. There is also an old-fashioned market-place of the Arabs there, and a most beautiful but small public flower garden with a tolerably-large fountain of water at the entrance. The great plain of the Metidja did not appear to present any scope for artistic effect. It was rather dreary under a hot, withering sun.

In penning this rough note I was under the impression that it was possible some photographer might wish to spend a winter in a milder climate than that of England. The temperature of Algiers in January (the coldest month) averages 58° Fah., February 60°, March 62°, April 65°, May 70°, and it is possible that he might make his visits there pay in a business way, besides his residence in a fine climate during our winter. Portraiture there is at rather a low ebb. There is a photographic dealer in the Street Bab-el-zoun, but his stock was not of much account. Villas large and small, furnished and unfurnished, may be had for the season, all along the St. Eugene-road and at Mustapha Superieure and Inferieure. There are also several good hotels. Hotel D'Orient, the finest, is on the sea-shore, about the centre of the Boulevard—*déjeuner* 2 francs, dinner 4 francs, with wine, chambre 3 francs or more, service 1 franc; and he must be rather hard to please who would find fault with any of these. These prices are raised somewhat in the winter, when about 400 Englishmen and Englishwomen annually put in an appearance. I was there in midsummer, and might have considered myself in the position of the last man, as I did not happen to meet a single Englishman.

It is by no means difficult to get to Algiers. Leaving London on Thursday morning, you can arrive, *via* Paris and Marseilles, on Monday early. Every Saturday at 5 p.m. a steamer of the Messageries Maritimes leaves Marseilles for Algiers. There are also two other good companies in Marseilles who have steamers plying regularly across—notably, Valery Frères, who have some fine vessels on that line. There are several steamers weekly each way.

J. S. Dismorr.

THE LIMIT OF RETOUCHING.

Inasmuch as the beautiful, luminous, and warm shadows we see in nature are reproduced by photography as blacks, it is perfectly legitimate by means of retouching to veil this blackness; the high lights may be strengthened, and the spots, freckles, and defects of manipulation may be softened or removed; beyond this is a violation of truth.

At the last exhibition of the Photographic Society many photographs and enlargements might have been pointed out in which all the endless variety of texture, form, light and shadow to be found in nature were ruthlessly destroyed; all the pulp and suppleness of flesh removed, all character and expression blotted out, until the effect of a soulless China mask had been obtained.

An important enlargement, a lady's portrait, was especially untruthful, the greater part of the face being in shadow; that portion which was light was placed in contact with a dark background, and appeared as hard and unvaried as a white line ruled by machinery on a black ground would be. It should be remembered that under these circumstances photography would always give a much harder outline than is found in nature; and, therefore, the utmost care should be taken to preserve all those indications of form of which the outline of a face is full, all so refined and subtle, and each having its light and shadow. Even spots and freckles may be allowed to remain, because they would in all probability help to round off the outline; and the background ought certainly to be varied and lighter where it comes in contact with the face. Often in the works of great painters a double outline may be traced, made by the dark transparent colour used for finishing the background being taken up to the outline only here and there; and in some places it is left by a crisp touch, which gives great spirit and animation. It must be observed here that there is no such thing as an outline in nature; it is merely an expression. To do as little as possible, and to know where to leave off, ought to be the aim and study of the retoucher. He is the prince of artists and of men who knows when his work is done. On this Appelles founded his superiority over his contemporaries, &c., &c., *Fuseli, 130th Aphorism.* The sacrifice of the essentials of art for its refinements and puerilities has, in all ages, caused the destruction of schools of painting; and excessive retouching will, in like manner, destroy all the value of photography. "Truth above all things" should be the motto of all followers of photography; for the art is valuable only so far as it is truthful. As a noble example of untouched photography I would draw attention to the portrait of Sir Henry Taylor, by Mrs. Cameron. In this picture the man lives and thinks. It is great in style and unconventional in treatment, and possesses the rare quality of action in repose; the modelling is excellent, every line of thought and suffering is well expressed, but not obtrusively so. Place the negative from which this picture was produced in the hands of a tasteless, soulless retoucher, and to what a vapid, expressionless thing he would reduce it, especially if instructed to give it the *Berlin finish!* What a priceless possession an untouched photograph of Shakespeare would be!—how unsatisfactory and tantalising a retouched one! Again: how precious to the bereaved is the faithful image of a lost friend or a dear relative! Remove expression, character, or even peculiarity, and how little comfort such a remembrance would bring! The mourning survivor looks upon the shadowed picture of the beloved one; he searches for the familiar lines of thought or age, the marked and decided feature, the pronounced characteristic. Too often he seeks in vain—all is smooth and pretty, meaningless and vapid; for the vigorous portrait painted by the honest sunlight has been submitted to the tender mercies of the Retoucher!

Robert Faulkner.

Contemporary Press.

PHOTOGRAPHIC WASTES.

[Anthony's Photographic Bulletin.]

A good deal has been written from time to time on the subject of photographic wastes, and with the good intention of inducing photographers to be more saving of them, for it is a fact that but little more than five per cent. of the silver used in printing is left in the finished print, the remainder being lost *if not saved.* It has been ascertained by careful experiment that over ninety per cent. of the silver used in printing *can be saved*, and the saving of which has been made the subject of a patent. This patent claims the use of *sulphuret of potassium* for the purpose of recovering the gold and silver from the mixed waste solutions of the photographer. In connection with said patent I have had several circulars addressed to me advocating the purchasing of it, or certain shares of the same, by the members of the National Photographic Association, and asking me to give my opinion as to the advisability of the purchase, and to mail that opinion to Mr. Bell. Now in place of so doing I propose to publish my answer, and to give my reasons; and in order to do so I will go back to the years 1853, 1854, and 1855 (over seventeen years ago), and find out what was done and recommended in those days. I do not find any particular evidence that the prints were then trimmed before fixing and toning, therefore most of the silver had to be found in the old baths, washing water, and in the hypo. bath.

I find that for old baths and washing water were used—

Chloride of sodium,
Hydrochloric acid.

From hypo. and cyanide fixers were used—

Sulphuret of ammonium,
Sulphuret of potassium.

Recrystallising the solution and exposing the salt to heat with carbonate of soda—

Nitric acid,
Caustic potash,
Sulphuretted hydrogen gas.

In old baths, washing water, and solutions that contained nitrate of silver (simple) you poured into the same a solution of chloride of sodium or of muriatic acid, which at once precipitated the silver in the form of chloride of silver, which precipitation was saved, dried, and reduced in the ordinary way; or, wet, by zinc or potass.

From mixed solutions, from hypo. and cyanide baths, the silver was precipitated in the form of a sulphide by pouring into the bath or solutions a solution of—

Sulphuret of ammonium, or
Sulphuret of potassium, or
Nitric acid;

or by passing through its body a volume of sulphuretted hydrogen gas; or by boiling the bath and then adding to it some liquor potass, boiling for some minutes, and then adding a little syrup of grape sugar or honey, and immediately all the silver was precipitated. In either case the precipitate was collated and reduced in the ordinary way.

Mr. Davanne, an eminent chemist, published the following in 1855, and recommended this simple apparatus and method of saving silver from mixed solutions:—

"Two vessels of equal size, from a quart to a hogshead, according to the scale upon which photography is practised, are each fitted with a cock at about one-third or one-fourth from the bottom. They are placed on a stand so arranged that the cock of the upper may discharge into the lower, while the lower is sufficiently elevated to allow of any suitable vessel being placed beneath its tap to receive the water let out from it. All waste liquids containing silver, whether as hyposulphite, cyanide, nitrate, &c, wash-water—in fact, all water used in the laboratory likely to contain traces of silver—are to be poured as they occur into the upper vessel without any care as to the reactions which may take place there. When the upper vessel is nearly full a solution of *liver of sulphur (pentasulphide of potassium)* is to be added in small quantities, agitating after each dose. This solution should be of the strength of one part by weight to three parts of water, and is best filtered. A precipitate of sulphide of silver will immediately fall, and the solution should be added until this ceases. If the liquids contain free acids, such as acetic acid or others, the end of the operations will easily be perceived by the water becoming milky from a separation of sulphur. An odour of sulphuretted hydrogen will be emitted at the same time; hence it is better to operate out of doors. The whole is then left to rest for half-an-hour or more; the whole of the sulphide falls to the bottom, and when the cock is turned the water flows almost clear into the second vessel, where the last traces of sulphide will settle. It may be ascertained whether the precipitation is complete by adding a few drops more of the solution of the pentasulphide to the liquid in the second vessel. If a new black precipitate appear a slight excess of the sulphide must be added, and the whole left to settle; then the liquid drawn off by the second cock will contain no appreciable trace of silver. The same operation may be repeated until the quantity of precipitate accumulated reaches nearly up to the cock. The precipitate is then collected, dried, and reduced, &c."

I have his authority for saying that ninety-five per cent. of the silver used in forming the print can be saved. And I now say and make public my answer to the question asked of me in a printed circular received, as to my opinion in regard to the policy of buying up the so-called Shaw's patent for the recovery of silver from the photographer's wastes, claiming, as I understand it, the use of *sulphuret of potassium* for that purpose—that, inasmuch as the *chemicals claimed* by them have been known and in use (and published) for the purpose named for *upwards of seventeen years*, and that other chemicals and other means can be practically and profitably used, therefore I do not advise the purchase of the so-called Shaw's patent by the members of the National Photographic Association. JEX BARDWELL.

N.B.—I would state that the liver of sulphur and pentasulphide of potassium are but other names for sulphuret of potassium.

Our Editorial Table.

HOW TO PAINT MAGIC LANTERN SLIDES. By A. N. RINTOUL.

London: BRODIE AND MIDDLETON, Long Acre.

WITH the above manual we have received from Messrs. Brodie and Middleton their *Illustrated Catalogue of Colours and Materials for Oil and Water-Colour Painting*, together with specimens of their transparent colours for glass and their photographed outlines for colouring.

To speak of these in rotation:—The little treatise on painting lantern slides seems to have been written with an express view to the subjects having been photographed or otherwise put in outline upon the glass, and the directions for applying the colours are very plain indeed. Here is an example:—

"We may once for all observe that almost every tint requires softening with the dabber, and a clean one must be used for each tint. Some painters use the finger instead, but the dabber is certainly preferable, as it gives an atmospheric appearance to distance; but it must be employed with due caution because a too frequent use imparts a woolly effect to the picture, which destroys all texture. Trunks of trees, rock, foreground, &c., must be boldly painted in, not dabbed, till they become more like needlework than what they are intended to represent. If, in the progress of the painting, the tints become so dry that the dabber fails to smooth them, the amateur must breathe on the glass to render them a little humid, and re-dab them. When the sky and clouds have been once covered in then paint in the distant hills—those in the extreme distance with blue, blending it into the middle distance with purple, and that again with cool green, and on nearing the foreground. If there be any new buildings they may be laid in with a pale orange tint, and, at the same time, the sandy road or path with the like. Should the buildings be old use, instead, a pale wash of brown."

And soforth, with other matters of interest to the maker and colourist of photographic slides.

The illustrated catalogue of colours and materials contains eighty pages of matter, so varied that we can only refer to the title for the nature of its contents. The transparent colours we have tried, with much satisfaction. But we had previously seen what effects they were capable of producing, at the Polytechnic Institution, where pictures painted with the pigments of this firm are nightly shown. The photographed outlines look extremely well without any colour at all, for the subjects being well selected, and also photographed so as to show with the greatest possible degree of purity, they answer wonderfully well as they are, without, however, possessing that charm which colour alone can supply.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

AT a meeting on October 17th Dr. Vogel presided, and, after new members had been admitted, proceeded to business by laying before the meeting the new books and periodicals received. He made special allusion to the songs and sketches of Herman Krone, entitled *Isis and Osiris*, containing various humorous, scientific, and photographic poems; and he also commended the *Colourist's Guide* of Julius Thiele.

A discussion then arose upon the methods employed for treating weak negatives in printing after lighting, Herr Schaarwächter contending that a method published by Herr Engelmann was virtually the same as one he had introduced months ago.

The CHAIRMAN, however, said that the plan of Herr Engelmann so far differed in that he did not bring his glass pane into play until after the customary half, or under-exposure, had been completed.

The SECRETARY remarked that this new plan was analogous to that employed in producing pictures by means of one negative superimposed upon another.

Herr Hartmann exhibited some stereoscopic pictures which showed conspicuously the ordinary defects to be met with in such. Some were mounted too far apart, some too close together, some awry, and some composed of pictures which were indeed taken from the same object but not of the same size; yet all these pictures came together in the stereoscope with more or less ease.

Dr. ZENKER said that the human eye was wonderfully adapted for viewing objects stereoscopically. Hence the intentional deformities which Herr Hartmann had prepared to illustrate this point were really involuntarily corrected by the eye of the beholder. He cited the instance of two pictures taken successively of the same person, one of which showed a bright, and the other a gloomy, expression. When mounted together and placed in the stereoscope these two pictures came together quite readily, and displayed a face wearing an expression midway between the two. In spite of that, however, he (Dr. Zenker) thought that there were not many pictures which were easy to render stereoscopic, and he had not yet succeeded in satisfactorily finding out the reason why.

Herr PRÜMM had taken a bouquet of flowers at a distance of ten inches from the stereoscopic camera, and thereby obtained pictures which in the stereoscope were very difficult indeed to blend. The reason of this was to him obviously in the fact that the lenses were, out of all proportion, too far apart from each other in relation to the short distance between them and the object to be photographed, and he thought that the same cause was at the root of the difficulty in other instances.

Herr O. LINDNER thought the cause lay in the difference of men's eyes.

Herr REICHARD remarked that, in regard to landscapes, the practice was not unfrequent to move the camera several feet in taking the two halves composing the picture, and he thought it quite probable that this was carrying the thing too far, and producing the inability to cause the images alluded to to combine.

Dr. ZENKER followed this up with the observation that probably the great distance between the points whence the views were taken had caused the side-scene-like appearance so noticeable in many stereoscopic pictures, particularly those from England and France—not so much in those from America. And with regard to lunar stereoscopic photography, he said that it was not necessary to alter the spot whence the two views were taken, but to take them at two different times—half a year apart. In the course of that time the moon would have shifted her face a little, so that when the second plate was taken a slightly different view from the first was obtained.

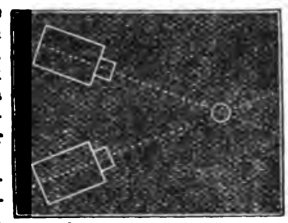
Herr LINDNER held that the lenses should be the same distance apart as the eyes, viz., about two and a-half inches, which was the right distance, whether for figures or landscapes. Placing the lenses further apart would not give stereoscopic pictures at all; for what was not according to nature could not be made so by artificial means.

The SECRETARY could not see anything imperfect or contrary to nature in such greater separation if the stereoscopic view showed the view distinctly and rounded as the eye saw it, for the eye itself was not perfect. Helmholtz had certainly, for the purpose of giving solidity to distant objects, made a special apparatus, called the "telestereoscope," which gave exactly the same effects as the two halves of a stereoscopic picture taken widely apart from each other.

The CHAIRMAN agreed in this. He esteemed a beautiful, solid effect to be the actual product of every stereoscope, no matter whether in taking the picture the means taken to obtain that effect accorded exactly with nature or not. He said that this "rule of nature" in photographic pictures was not generally so easily settled as people thought, as witness the various discussions over the question of the defects of perspective in photography.

Herr PRÜMM said that when the object was very near the distance between the lenses ought to be proportionately reduced, as was the case with the eyes. He was certain, from the example he had already given, that a distance of ten and a-half inches was altogether too much for his bouquet of flowers.

Herr HARTMANN remarked on this that in the observation of very near objects the axis of the eyes converge in a way that did not take place with the lenses of a stereoscopic camera. If, therefore, photographers were to work with only one lens, and move the camera as shown in the annexed figure, the result (with near objects) might be similar to the images produced in the eyes.



The CHAIRMAN exhibited some examples of his researches into the sensitiveness to light of bromide of silver, as shown by the action upon it of the colours of the spectrum. He had made use of Colonel Wortley's plates and the alkaline method of development. By this means he had found a far greater degree of sensitiveness than with ordinary bromide or iodide of silver developed in the old way with acid. In his researches he had placed a prism directly in the camera, and before it a tube having a small slit. With an ordinary bromo-iodised plate and acid development the action of the light showed itself slightly beyond the line E—that is, in the green ray in the prismatic image; with bromide only and the same development, according to Schultz-Sellack, the light only acted as far as the middle of the blue (near F). On the other hand, the sensitiveness of the bromide was distinctly increased under alkaline development, and reached to the red-yellow. It was very noteworthy that with Colonel Wortley's plates a weakening of the impression towards the blue and a strengthening towards the green rays was distinctly exhibited.

The SECRETARY asked why a lens was necessary in this operation when the plates could be made to receive direct the image of the spectrum without its intermediation.

The CHAIRMAN said that it was not possible to take Fraunhofer's lines without the lens, and they were the only gauge one had of the range of the chemical action.

Dr. ZENKER inquired how the ultra-violet rays stood as regards sensitiveness.

The CHAIRMAN said he could not test that, for, unfortunately, his oxygen glass prism absorbed them mostly. And, in answer to a further question from Herr Prümm, relative to the length of time which an alkaline developer might take to work, and whether it could be applied to wet processes, he (the Chairman) stated that it could so be used, and that as to the duration of its action it was as rapid as the ordinary acid developer; practically, however, he did not think it of much avail for wet processes, for it was not usable with iodide of silver, being only available with bromides. It was also much more difficult to get clean plates with an alkaline developer than with an acid.

Herr Stack, of Guben, had forwarded two "collodiometers" for inspection. The instrument, it appears, is constructed similarly to the argentometers in common use, having an air-bulb which causes it to float high or low in the liquid, according to the density of the latter. It was remarked by the inventor that in the case of collodion the temperature and the proportions of alcohol and ether had so much to do with the density that precautions were needed in using the instrument. The temperature first was fixed at 62° Fah., and it was provided with four scales answering to the four proportions of alcohol and ether.

The general opinion appeared to be that it would prove a useful thing in testing the quality and contents of samples of commercial collodion, if they could only first know what the proportions of ether and alcohol in each were.

The SECRETARY said it would be of most use for testing home-made collodion.

Some one having asked how long uniodised collodion would keep,

Herr PRÜMM said that he believed it would keep at least a year. He further remarked how different samples of pyroxyline, even when used in equal quantities, gave films of various thicknesses, and asked if that fact would not have an influence upon the collodiometer. Collodion was generally made thinner now by dealers than it had been formerly.

Some pictures were then presented, done by Muybridge, of San Francisco; and, after sundry questions had been answered, the meeting was adjourned.

PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

AT the last meeting of the above Society the President, Mr. H. J. Newton, occupied the chair. The minutes of the proceedings of the previous meeting were read and approved.

New Preservative for Dry Plates.—The PRESIDENT said:—I have been invading the kitchen again. I mixed some mustard seed with tea for a preservative for dry plates, and I found it increased the sensitiveness very much. I took two table-spoonfuls of mustard seed and two table-spoonfuls of Japanese tea, and poured on eight or ten ounces of boiling water, covered it over, and let it stand and steep for one or two hours. I then added ten grains to the ounce of sugar-of-milk, and filtered through cotton; made up to ten ounces, and added two ounces of alcohol. It was then ready for use. I found that the plates would give the same detail in a minute and a-quarter that with the tea alone would take five or six minutes. I found, also, by crushing the mustard seed in a mortar before it was steeped with the tea it made a much more sensitive plate than in putting the seeds in whole; but they did not keep as well, and were nearly worthless in two weeks. With the seeds whole it required about two and a-half minutes', and the other way about a minute and a-quarter's, exposure, while, in general, I give five minutes' exposure to tea. I afterwards tried the oil of mustard, but I found it was a difficult thing to handle. It is very volatile and irritating, and makes a blister on the skin where it touches, and is trying to the eyes. I took a quarter of an ounce of the oil of mustard seed and put it in four ounces of alcohol, and it made a very brilliant negative. It had the same sensitiveness as the whole seeds. I have here negatives which were made with some cotton made from the formula that M. Duchochois gave me. It came out very fine and quick. I developed one with iron, to which I gave forty seconds, and it was altogether over-exposed. I have brought some prints from the dry-plate negatives by this process. Here is one which was made with a negative exposed forty-five seconds and developed with alkaline development. I did not gain anything in time by developing it in that way, because it took four times as long; but there would be an anvantage in taking an animal or living subject which you wished to secure in a short time.

Mr. KNOWLTON said he had conversed with several about the Shaw patent. The owner seemed to be trying to sell it to the National Photographic Association for a large sum; and those who would not buy licenses must give him their wastes to refine, or be prosecuted. He introduced

Mr. B. E. VALENTINE, an attorney, who, after some remarks concerning the patent, said he came not to make a speech but to listen. He would be glad to give them any information in his power, having been consulted by many regarding their liability under the Shaw patent. The committee appointed by the National Photographic Association had recommended the publication of the counsel's remarks, and he had only lately seen the same. He explained that a patent is not what in the odious sense of the word it is understood to be, but merely an agreement between the government and an individual, granting him as its sole agent for a term of years, but demanding an equivalent. Such article or process must show originality and usefulness—that Mr. Shaw claimed the use of sulphuret of potassium, substantially as set forth, &c.; but, according to his patent, the apparatus he uses for collecting residues is included in it, and he thought that not one artist in every one hundred was virtually infringing Shaw's patent, nor that any damages could be collected under the patent as it now stands.

Mr. A. A. PEARSALL asked if any experiments had been made with green glass. No one responding, he (Mr. Pearsall) spoke of his former trials and attempts to follow it out as described by Mr. Newton, and his subsequent failures; that, although he was upheld in his opinions by most of those who were present, in condemning it for practical photography as far as he had experimented, Mr. Newton had attacked him very savagely regarding the "principle involved," and which principle he (Mr. Pearsall) had never elucidated. That Mr. Newton explained the "principle" as being the "action of light on the salts of silver." He read extracts from Mr. Newton's article in the *Bulletin* with comments thereon.

Mr. EALES suggested that all should try the experiment and report.

Mr. KNOWLTON said that Mr. Newton had made two negatives of him, in his own house, and that a negative taken in fifteen seconds by the aid of the green glass auxiliary was better than one exposed thirty seconds without using the green glass.

Mr. PEARSALL said he was open to conviction, and if any one would show him wherein he had erred in using it he would be glad to change his opinion. He had used many samples of glass, in every conceivable manner, but all had resulted in failures, and he was forced to condemn it as far as his experiments were concerned.

Mr. KNOWLTON moved, and it was carried, that Mr. Newton be invited to attend the next meeting and explain regarding the use of green glass.

Mr. BOLLES asked whether any member had tried Edwards's process, and with what success. No one responded.

After some other business the meeting was adjourned.

Correspondence.

A GLANCE AHEAD.

I AM writing these lines on the morning of New Year's Day, which has opened upon us gloriously here—without a cloud—reminding me of southern Italy at this season rather than of western France. Let me accept it as a favourable omen. When the sun shines so bravely on the first of January one may surely look forward hopefully to the photographic work of the new year. May it be a happy and a prosperous one to you all, dear readers!

In my letter of a fortnight ago I cast a retrospective glance upon the history of our art during the past eighteen years. I will now invite my readers to join me in a look ahead. In what special directions do our hopes of progress now chiefly lie? Where are our processes and appliances open to improvements? In what ways may we hope to advance our art this year—optically, chemically, artistically, and commercially? How can we render its practice more sure and more agreeable?—more useful and more remunerative? These are questions which at the commencement of a new year it behoves us all to weigh carefully.

I will beg leave to address a word or two first to my professional readers.

Are they quite satisfied with the construction of their glass rooms? Is the lighting of their sitters managed on right principles? Would Sir Joshua Reynolds, Rubens, or Vandyke be satisfied with it? What is the principle on which all great portrait painters have proceeded, and if photographers depart from it, why do they do so? Because they want more light, I may be told. But *where* do they want more light? Upon the face? No! Then it must be for the shadows. But the shadows can be lighted easily enough by means of white reflectors. Then why build a glass *house*, with a glass *roof*, letting the light from the zenith fall upon the crown of the head of the sitter, and making the room as hot as a conservatory for delicate exotics? And then comes another important question—Is your studio *long* enough? Think over these points; and let me offer you the following suggestions. To live in the outskirts of a town rather than in the midst of its smoke and gloom; to rent a house with a large garden, and in this to build your studio in the following simple and inexpensive manner:—Fifty feet long, seven feet wide, with a flat roof covered with felt, and the sides and ends of feather-edge boarding. Let it have two windows facing each other in the sides near each end—that is to say, four windows in all, extending from floor to ceiling, and four feet wide, provided with solid shutters. Let *one* of these windows only be open at a time, and let a portion of that be covered, if necessary. Let each end of the room have a background, so that the sitter can be placed at either end, according to circumstances, and be lighted only by the side window, which will be very close, and by reflectors placed on the opposite side. Let the room be papered with dark-blue paper both on the walls and ceiling. Let the eyes of the sitter always be directed into the darkness of this tunnel; and let the camera be placed as far as possible from him. He will then be lighted by one dominant light only, and not by general diffused light; and the shadows will receive reflected light coming also from one dominant source only—a condition which would satisfy perfectly any of the great portrait painters, whilst the exposure would be less than it is at present in an ill-constructed studio, and there would be vastly more roundness and modelling in the face and figure. The advantage of the tunnel with four windows is that its aspect would be perfectly immaterial, and thus a great trouble in building would be got rid of. But mind that it is well ventilated and cool.

We come next to the process of taking the negative. Beware of halation round the dark outlines. Look to your prints, and if it exist do not rest satisfied, for it is a hideous defect, and not altogether incurable. Try also to take negatives which come up gradually to the right density without requiring any subsequent intensifying, which adds greatly to the coarseness of the deposit. But the process of the future is that with bromide only, a strong bath, a hygroscopic preservative, and an alkaline developer. Give this your serious attention; for not only are the films much more sensitive, but they will keep for hours without losing their good qualities, so that more time can be given to the artistic posing and lighting of the sitter and to watching for a pleasing expression. With this process, in such a studio as I have suggested, the exposure never need exceed two or three seconds; so that with a reflecting camera, it could be watched for upon the ground glass and be given unconsciously to the sitter during a pause in the course of conversation. With respect to this new bromide process, your quickest and best plan would be to learn it from some one who has made a study of it and mastered all its peculiarities. And this reminds me that we sadly want a photographic college, where the different branches of the art would be perfectly taught, and where a diploma of proficiency would be conferred.

Our optical appliances are now well-nigh perfect, but a portrait lens with *both* compounds cemented would be perhaps an improvement upon the present form.

Printing is the next subject on which a few words must be said, Our present mode of silver printing still holds its ground, for nothing can surpass it in beauty, whilst it is not all *couleur de rose* with the rival process. Carbon prints and Woodburytypes both require fixing with alum, and this may be imperfectly done by assistants. Collotypes also may peel off in patches. So every process has its special difficulties and objections. The great convenience of silver printing is that the progress of the exposure can be readily watched. Silver prints may, I think, be regarded as permanent when proper pains are taken with the fixing. When thoroughly washed after the gold bath and fixed in fresh hyposulphite, followed by hot water washing, no fear need be entertained about their fading. I may here mention a very curious fact, viz., that if a silver print be rendered translucent by impregnating it with a mixture of benzole and almond oil the existence of sulphide of silver within the pores of the paper will be immediately revealed. A really good plain paper process is wanted for enlargements, so that they may resemble engravings upon India-paper, and have an absolute black colour and all the juicy vigour of printing-ink, without the glaze of albumen. I have just now on the stocks a novelty of this kind, and will describe the process soon; it seems to answer perfectly, and is very simple and economical. The method employed by Mr. Hannah yielded rather nearly blue-blacks, which were objectionable; whilst developed prints are often coarse and faulty in definition and gradation.

Carbon printing upon mica for *cartes de visite* may, perhaps, have a pleasing novelty. The process was suggested to me the other day by Mr. J. A. Spencer, of the Autotype Company, and it is most delightfully simple. A piece of black pigmented paper is excited in a bath of bichromate of potash, and is then pressed with the pigmented side in contact with a sheet of mica, by means of a squeegee, and left to get dry, when the two, of course, adhere firmly together. The printing is then done *through* the mica, which saves the usual risk of injury to the negative. The development is effected by simply putting the sheet of mica, with the paper still attached, into warm water. The paper soon peels off, and leaves the image upon the mica. It is now a black transparency, but when mounted upon a white card, with the image in contact with the card, it shows as a fine vigorous black print, which is non-reversed. I strongly recommend this process to the notice of portraitists as the simplest method of printing at present known, and yielding beautiful results, which are deficient in no technical quality. The manipulation is so easy that anyone may succeed at the first trial. The exposure is only one-third of what a silver print requires, and the effect is that of a beautiful enamel. It has occurred to me that instead of mica a film of plain collodion might, perhaps, be employed, spread upon mica, and subsequently detached so that the same sheet of mica might be used many times in succession.

Enlargements are now occupying a great deal of attention amongst professional photographers, and many different systems are on the *tapis*. It seems to be agreed that the old plan of enlarging by the solar camera or by artificial light, with development, yields coarse and inferior results, which require a vast deal of retouching. So the present method consists in taking a positive transparency from the negative, and then an enlarged negative from that, which allows three separate chances for retouching, whilst the ultimate print, which is upon albumenised paper, is not retouched at all. The problem seems to be how best to take the transparent positive. On this subject we had in the beginning of last year a capital article in this Journal, from the pen of Mr. Foxlee. He recommended, as I think wisely, to take an *enlarged* transparent positive in a copying camera, say up to 12 x 10, and then to work upon that and copy it again. This must surely be better than printing the transparency by contact with the negative upon a dry plate. To those who follow this system I would suggest to use moist albumen plates both for the enlarged positive and negative, and not the common wet process. They will find it a great comfort to work with washed films. But the question also arises whether *paper* would not do perfectly well for the enlarged negative; if so, it would be a great gain in every way, for operating upon large plates of glass is not exactly a joke from any point of view. Being one of the oldest paper men I hope to take this matter up, and have more to say about it some day.

Those who print magic-lantern slides or glass transparencies in a copying camera will find that moist plates with an albumen preservative yield far finer results, both in colour and vigour, than the cold grey prints which are obtained by the common wet process. In fact, moist plates will also be found better for many purposes where dry ones have hitherto been employed. These plates are also admirably adapted for copying paintings and prints. If a reversed negative be required you have only to wipe and polish the back of the plate, and put it into a properly-constructed slide with its back to the lens.

But the problem which has the greatest interest for professional photographers is that of COLOUR. From the very first this has been felt, and even the early daguerreotypes were tinted with powder colours. But, strange to say, up to the present moment no really good and economical mode of colouring photographic portraits has been introduced. Coloured portraits are not only costly but, too often, gaudy, vulgar, and inartistic. Perfect horrors in colour have even found their way into the exhibitions of the London Photographic Society.

It remains to be seen how M. Vidal and M. Laroche will succeed with their new methods; but both are troublesome and complicated, and quite unsuited for the production of a *small* number of coloured copies from a negative, such as sitters to a professional portraitist would in general require.

It is with infinite pleasure, therefore, that I have to announce the discovery in France of a new method of colouring photographs, which is about to be made the subject of a patent both in France and in England. The results are so extremely beautiful, and are produced by such simple means, that I know of nothing more likely to please the public or interest the profession than this most important novelty. The beauty of the pictures when thus treated consists in their harmony, sentiment, and thorough art qualities. They combine vigour with softness, and exhibit richness without gaudiness or vulgarity. As for gradation, they more than equal—they *surpass*—the most exquisitely-finished miniatures or enamels. The process is suitable for all kinds of photographs, whether upon glass or paper, by whatever process printed and of whatever size; whilst the cost can be made so low as to render coloured card portraits as common almost as plain ones are now. More than this I cannot say at present, but as soon as the patent has been taken out I will publish full particulars. I trust that our Editors will permit me to say thus much in anticipation of what is shortly to follow, as it certainly forms one of the great novelties which I may point to as already looming through the haze of the future.

It remains now for me to offer a word or two to my amateur brethren, for it is to *their* ranks that I belong, and our tastes are more especially in common.

The dry collodion processes are what chiefly interest amateurs. To them it matters not greatly whether they have an occasional failure, provided they can carry about with them on their country rambles, and expose when they choose, sensitive dry plates which will retain their good qualities indefinitely, and can be developed on their return home.

But in allowing a plate to get dry there are these great inconveniences, viz, the tendency to wrinkling and blistering of the film when it is wetted again; the increased translucency of the film, which renders a red backing necessary in order to present flare; and the risk of the destruction of the latent image by long keeping after exposure.

As a remedy for the first of these evils a substratum is employed. The best is, perhaps, india-rubber dissolved in chloroform, in the proportion of one grain to the ounce; but every additional film has its own additional specs and flaws to detract from the perfection of the negative.

For a red backing I would recommend the use of a substratum to which our attention was first directed a few months ago by Mr. Henry Cooper, viz., aurine. This is soluble in ether and alcohol, though not in water, and may be added in considerable proportion to plain collodion. When poured upon a glass plate the effect is precisely that of orange-coloured or ruby glass, and, as the optical contact is perfect, it makes an excellent backing for dry plates. It can be easily removed by a tuft of cotton dipped in alcohol, and, what is very important, it does not dirty the dark slides. Aurine can be obtained from Mr. Judson, in Southwark-street, London, at a very moderate price.

I may here mention the singular fact that, if added to bromised collodion containing only three grains of cadmium bromide per ounce, and no iodide, aurine plays the same part as iodide of silver in the film in preventing flare, and may be used instead of it with a thirty-grain bath. It imparts a yellow colour to the bath, but thus far I have not found this produce any bad effects with bromide films. I am alluding here only to the preparation of *washed* films, where I have proved iodide of silver to be quite inert *chemically*, and merely to act as so much yellow colouring matter.

But the more important matter in connection with washed films, both wet and dry, is the purity of the washing water. This is the real key to success. The nature of the preservative is comparatively unimportant; but for dry plates it should be one which gets perfectly dry, and does not contain any hygroscopic substance.

The secret of good keeping qualities *before* exposure lies in leaving a trace of unconverted soluble varnish in the film; whilst, *after* exposure, it lies in giving the film a final application of gallic acid, which seems to counteract the destructive effect of the unconverted bromide upon the latent image, owing, no doubt, to its own properties as a developer.

Both professional and amateur photographers are interested in the subject of instantaneous photography. It is obvious that we cannot always go about in a cab with yellow windows, and fitted up with baths, &c., in search of such bits or natural effects as make charming instantaneous studies. We must have either rapid moist plates or rapid dry ones. By the bromide process with the bath these can be easily prepared so as to beat common wet plates hollow in sensitiveness. We only want, therefore, a suitable instantaneous portable camera for small negatives, or converted positives, which can be afterwards enlarged. The introduction of such an instrument is a subject to which we may, I trust, look forward with confidence. At any rate, it belongs to the dreams of the future.

I have now shown, I hope, that there are still some important novelties within our grasp, and that if we persevere we may realise some of them during the year upon which we have just entered. But let us always work in *promising* directions, and not throw away time, and cash, and temper, in the chase of any *ignis fatuus*, which a little reflection would show could never have any real practical value.

There is no other French news of interest this week, except that to which I have already alluded as relating to the subject of colour.

Redon, January 1st, 1874. THOMAS SUTTON, B.A.

MEDALS.

To the EDITORS.

GENTLEMEN,—With reference to the system of medals, &c., there are certain conditions that should be strictly enforced as to the *bona fides* of exhibits, to prevent the miscarriage of the intended distinction. I mention this as the following has recently come to my knowledge:—

Some few years ago I took some negatives for a person calling himself a photographer, but who in reality was only an employer of labour, having himself no knowledge of photography whatever—not even of the rudiments of the art. From these negatives prints were obtained and sent in competition, and in his own name, to the late Vienna Exhibition, and obtained there a reward.

Surely some effort should be made to prevent this sort of thing, and the public from being misled as to the status of such so-called photographers.—I am, yours, &c., E. D.

Preston, January 5, 1874.

DIALYSERS.

To the EDITORS.

GENTLEMEN,—The following is an extract from a leading article in your Journal of last week, giving an account of the dialyser and its uses:—"The bottom must be formed of such a material that, while under certain conditions it will allow salts to pass or filter through, it must not permit the liquid in which the salts are dissolved to do so."

I believe the following is a correct statement of the action set up during the process of dialysis:—Given a colloid substance and a salt dissolved in a liquid; also, given a liquid capable of dissolving the above salt; then, if the colloid substance and the salt in solution be placed in a dialyser and suspended in the above liquid an action commences, ending in both liquids being of the same specific gravity so far as the salt is concerned,* though of course when the gelatine remaining in the dialyser is taken into account this is not the case. I take the above to be a sufficient reason why a *collodion* emulsion could not be freed from a soluble salt, unless a liquid identical with the solvents of the collodion, and mixed in the same proportion, be employed for suspending the dialyser in; for, were water or weaker solvents used, the constituents of the collodion would be changed or the cotton precipitated. Still, if ether and alcohol in the right proportion were used, the so-called "soluble salts" would, I think, be *insoluble*.

I have been induced to write this because I noticed that you mention *collodion* among other emulsions as being capable of being "washed" by dialysis. According to your theory the soluble salt is carried by the liquid of the emulsion to the extreme limits of its territory, so to speak—that is, say half-way through the septum—and is there delivered up to the authorities on the other side of the border, no intermingling of the officials being allowed. This appears to me to be a correct view of your theory as hinted at in the passage quoted from your leading article at the beginning of my letter.

According to Dr. Monckhoven's experience, given in a paper published in THE BRITISH JOURNAL OF PHOTOGRAPHY, November 10, 1871, precipitated pyroxyline may be dissolved in alcohol. I have not found this to be the case; on the contrary, the pyroxyline is less soluble in ether and alcohol than before it was precipitated, though this fact may be due to its not being in so fine division as the ordinary cotton.

I have made an emulsion by the following method; but for some reason or other, which I have been unable to discover, it gives very slow and thin images:—For two ounces of emulsion I made two separate solutions of cotton—one containing bromide of ammonium and the other plain. The first solution contained about seventeen grains of bromide of ammonium and eleven grains of cotton to one ounce of solvents. This was sensitised by taking thirty grains of nitrate of silver in water and precipitating it with bicarbonate of soda, then washing it, dissolving in ammonia, and adding it to the bromide collodion with shaking. The emulsion was then precipitated with water (distilled) and dried, after which it was dissolved in the plain collodion above mentioned, which contained four grains of cotton to each of the two ounces. This emulsion gives a fairly opaque film; but, when organified and exposed for fifteen seconds with the full aperture of a compound stereo. lens, the subject being a northern sky, at two p.m., perhaps a slight indication of exposure may be perceived on application of the alkaline developer. This result seemed to indicate the presence of a large excess of bromide; but, on testing for it, no trace was apparent. Thinking that perhaps carbonate of silver might be the cause of insensitiveness I added a drop of nitric acid to the emulsion. This addition was not followed by effervescence, though on shaking and taking the stopper out of the bottle I could hear a sound much like that of effervescence, but, after continued shaking, attributed it to the bubbles bursting.

The cotton was some of my own making after Dr. Nicol's formula; and I have been somewhat surprised to find that it gives a *structureless* film and tough. I believe this is not as it should be. The cotton was washed during twenty-four hours in a small, running stream of water which contained carbonate of lime; but I do not think that could affect the collodion.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester,
January 6, 1874.

[In our article last week we omitted to say that if *collodion* were to be dialysed it would be requisite to place the dialyser in ether and alcohol.—EDS.]

Miscellanea.

REMOVAL.—We notice that Messrs. Ordish & Co. have removed from Newgate-street to larger and more commodious premises, 108, Hatton Garden.

COLOURED GLASS NEAR AN EXPOSED PLATE.—Having a multiplying box with a card-size diaphragm, I tried a thin, light Prussian blue glass in one-half of it, and also in the full size; the effect was greater softness or middle tone, no perceptible loss of sharpness, no solarising, and clearness of shadows. The light ruby in the same place gave some of the same results, with but little longer exposure. The glass used was less than one-tenth of an inch in thickness. In the camera, near the plate, the thinnest gives the sharpest image.—*Anthony's Bulletin.*

MR. CROUGHTON'S PAPER AT THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.—Mr. Croughton writes to say, in reply to the "Peripatetic Photographer," that he had no intention in what he said concerning Colonel Stuart Wortley's developing before exposing to indulge in a sneer at that gentleman. What he ought to have said was that *the developer was applied previous to exposing;* and that as his attention was called to the mis-statement at the time the paper was read he had signified his desire that the passage should be altered, which, however, had been overlooked.

USEFUL LABELS.—Mr. Thomas Gulliver has sent us the following interesting hints:—How much time is often lost, solutions thrown away, and mistakes made, all for want of a label on a bottle. The writer has frequently been a sufferer and a loser by neglecting the precaution of labelling bottles. Labels for bottles, parcels of negatives, book-post parcels, finished photographs, &c., &c., are easily made by using a solution of—

Gum arabic	2 ounces.
Dextrine	1 ounce.
Loaf sugar	½ "
Glycerine	10 drops.

Soak the gums in cold water, then add hot water until the solution will flow freely; spread this mixture on post paper with a broad camel's-hair brush. When dry, if you happen to have a sewing-machine, set the guide the required width, take out the shuttle thread, put in a strong needle, and take three sheets (one over the other) of the gummed paper; use the needle of the machine, and pass it on. The machine will perforate the paper nicely. Now set the guide wider, and perforate the paper the other way of the sheet. You now have ready-gummed and perforated labels ready for use. About double the size of postage stamps is a useful size. The sewing-machine will perforate the holes without in any way injuring the machine. I wonder the sewing-machine is not generally used for sewing the edges of books. A little amateur bookbinding may soon be done in that way.

RUBY-LIGHTED CAMERA.—A friend found difficulty in taking large views of Chicago's smoking ruins quickly enough to avoid smoke and clouds of dust. He tried four red windows of one and a-quarter inch diameter in the corners of the camera front-board with success. Having some rainy-day leisure I procured a variety of coloured glass and cut two windows in a front-board nearly two inches wide and six high at each side of a half-size lens. I attached rabbetted edges, so as to slide in any colour of glass. The glass merchant told me he had three grades, viz., light, pot, and dark. The costlier kinds are flashed; the cheaper colours are pot-coloured, i.e., body-coloured. My samples were about one-tenth of an inch thick or less. I found that the light-wine ruby, double flashed, shortened the sitting more than any tint of green glass. I direct my light towards my sitter, not towards my camera, using only a six-inch shade box, which projects scarcely two inches beyond the end of the tube. I have used the same for copying with success, My first effort at copying with ruby glass was a failure; having to remove my box shade to get near for an enlargement, I allowed the side reflection to fall too strongly on the ruby window. After using it in all weathers for one year I pronounce it a *success for every kind of work.* I use a good emerald green and a four-four tube with success; it does reduce the time, though not equal to ruby. What does ruby do? It works quickly in one-third or one-half time, sharply, with breadth and depth of field, and does not solarise in the centre; in short, it doubles the good qualities of any lens. Diaphragm the lens down to half diameter and it will work still more quickly, more deeply than of old. As to time of exposure, try it fairly. Don't think *overtime* is a fog with ruby. After more than fifty plates of four exposures each, using many single colours and several combinations or double glasses, I retain the *light-wine ruby* windows in the front-board. I use it continually for positives and negatives. If I open my ground glass I can see a chair distinctly through my ruby window. No fog—but the brightest, clearest pictures.—*Anthony's Bulletin.*

EXCHANGE COLUMN.

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

I will exchange a first-rate silver lever watch, English make, for a good bellows camera and *carte* lens.—Address, F. C. SWIGG, 15, Henry-street, Plymouth.

I will exchange photographic views, half-plate portrait-lens, whole-plate view lens, &c., for a repeating *carte* camera or cabinet rolling-press.—Address, F. M. SUTCLIFFE, Whitby.

An excellent new half-inch microscope object-glass, by Wray, will be given in exchange for a Dallmeyer's compound stereoscopic lens; difference arranged —Address, R. FORSYTH, 11, Dundas-street, Edinburgh.

A dark tent on wheels, 31 inches long, 18 wide, and 24 deep, so arrainged as that wheels, handles, &c., can be packed inside and form a box—will be exchanged for a Solomon enlarging apparatus.—Address, Sciopticon, Post Office, Preston.

* This result is not brought about by the salt *alone* passing through the "septum," but by the liquid in the outer vessel and the *salt in solution* interchanging equal volumes.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

John Thomson (Brixton).—*Portrait of H.R.H. The Duke of Edinburgh.*

The Birmingham Photographic Company.—*Portrait of Joseph Chamberlain, Esq., Mayor of Birmingham.*

Geo. Patterson (Ramsey, Isle of Man).—*Four Views of The Chasms, Spanish Head; View of Douglas Bay; and View of Port Skillian, Douglas.*

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

*** With the present number is given the Title-page and Index for our last volume.

J. G. T.—Send envelope for private reply.

J. D. FARLEY.—The patent has not yet expired.

CAPTAIN W. J. PARKER (Arcachon).—Remittance received.

HISTORICUS.—It is nearly two hundred years since Rubens was born.

JAMES F. COWEE. (Troy).—Remittance received. Subscription now paid to January 31, 1875.

W. KERMODE (Port Natal).—Remittance received. Subscription now paid to December 31, 1874.

J. L. W.—Albert's process is not patented in this country, hence it may be worked by those who choose to do so.

OLD PHOTO.—By purchasing negatives at a sale by auction no right is necessarily acquired to use them, unless as old glass.

JOSE DE BRUNET (San Sebastien).—Remittance duly received. Subscription now paid to December 31, 1874. The books will be sent this week. See next issue.

J. C.—The view is a pretty one, but great judgment and care will be required in printing from the negative, otherwise the front of the cathedral will be by far too dark.

A NEW SUBSCRIBER.—Before you can keep any gold brooches or lockets in which to fit portraits it will be necessary for you to obtain what is termed a "plate license," the cost of which is two pounds six shillings per annum.

F. Y. B.—For one who cannot afford to have many lenses, a *carte* lens of tolerably *long focus* and large diameter will be the most useful kind of lens to begin with, because it will take *cartes* and cabinets, and even, at a pinch, a whole-plate vignette.

A. B. C.—Immerse a slip of copper in the damaged silver solution, by which the whole of the silver will be precipitated in the metallic form. It must then be washed, after which it may either be dissolved in nitric acid or be fused with a little borax.

F. BENJAMIN.—Sugar has been added to the printing-bath for more than twenty years. When it was first recommended a special claim was made on behalf of it for the facility it afforded for retaining the paper free from discolouration for more than a week.

R. BRIDGART.—It is a pity we did not see the lens. But, instead of altering it, we recommend you to move the light a little closer to the condenser, by which the front conjugate focus of the condenser will be lengthened, and the cone of light so increased in diameter as to equal that of the back lens.

BOSS.—Although you certainly labour under serious inconvenience in your dark room, and its position is bad and its surroundings worse, yet the specimen enclosed as a sample of your ordinary work is very excellent. We advise you not to make any alteration upon it at present—certainly not the alteration you propose.

PROSODY.—1. Bichloride of mercury will diminish as well as add to the intensity of negatives. Everything depends upon the manner in which it is used. —2. The salt just named is a most powerful poison, and must be used with great care. One of the best and readiest antidotes is a raw egg, the albumen in one of which has been estimated to be sufficient to decompose four grains of the bichloride.

COUNTRY PARSON.—The proportion of wood naphtha added to spirit of wine to convert it into the methylated spirit of commerce is one-tenth of its volume. It is an essential feature of the methylating process that the wood naphtha be imperfectly purified. Of course, not only methylated spirit, but even the naphtha itself, can be deprived of its bad odour; but such purification will not meet with the approval of the officers of the Excise.

GEORGE B. BROWN.—There has been a misunderstanding on your part, but no mistake has been made. The cause of the misunderstanding lies in the fact of an ounce of metallic silver containing 480 grains, while in an ounce of nitrate of silver there are only 437½ grains. Metallic silver is always bought and sold by troy weight, while in negotiating for nitrate of silver avoirdupois weight is used. It is a very stupid system, and ought to be abolished.

FRANCIS IRVINE.—Try the following:—

Sulphuric acid (1·840) .... 10 fluid ounces.
Nitric acid (1·370) .... 5 ,,
Cotton wool .... 5 drachms.

Mix the acids, and allow the temperature to fall to 150° Fahr., then immerse the cotton tuft by tuft; allow to remain for five minutes, and then wash.

PATRICK COFFIELD.—A strong solution of ammonio-nitrate of silver, to which is added a little gum water to give it body, forms a good and popular marking-ink for linen. A little colouring matter of any simple kind may be mixed with it, otherwise the writing would be invisible until it was developed, which would be attended with inconvenience. After the writing has become dry apply a hot iron, which will make it very black and bold.

B. C.—Apply to any of the refiners whose announcements you will find in the advertising columns of the Journal or ALMANAC. Many jewellers keep silver wire, although only of sterling silver; whereas at the refiners' it may be obtained absolutely pure. For such purposes as corners of camera carriers we imagine that sterling silver will be sufficiently pure; still, to "make assurance doubly sure," it will be safer to employ the pure metal.

J. S. VICKERS.—To ascertain the specific gravity of the gold weigh it first in the usual manner, then weigh it in water by attaching it to a hair or fine thread suspended from one pan of the scales and allowing the gold to be immersed in a tumbler of water. Subtract the weight in water from the weight in air, and then use the sum thus obtained (the loss of weight in water) for dividing the weight in air by. The quotient is the specific gravity. Stated briefly, the rule is this:—Divide the total weight by the loss of weight in water; the quotient is the specific gravity.

RECEIVED.—W. Crookes; D. H. Cussens: Tyro; J. Garland; and C. B. Riversdale.

THE PHOTOGRAPHIC SOCIETY OF LONDON.—The next meeting of this Society will be held at the Gallery, 9, Conduit-street W., on Tuesday, the 13th inst., at eight p.m., when the following papers will be read. *Photographic Illustrations of the Eruption of Vesuvius of April*, 1872, collected and prepared by J. M. Black, Esq., J. P.; with Explanatory Remarks by Dr. Mann. *Note on the Production of Sepia-toned Silver Prints*, by William H. Watson.

OBITUARY.—THE LATE MR. WILLIAM CALLAGHAN.—We regret to announce the death of Mr. Callaghan, optician, New Bond-street. He had been slightly indisposed for a short time, but was only taken seriously ill, with bronchitis, on Wednesday, the 31st ult. By Monday last he had greatly improved; but on Tuesday morning last a sudden relapse set in, and he never rallied. Mr. Callaghan had for many years been sole agent in this country for Herr Voigtlander'r optical productions.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 13	London	9, Conduit Steeet, Regent Street.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

THIS valuable work will be ready tomorrow (Saturday), the 10th inst. For particulars see advertising sheet, page iv., in present number.

This year's ALMANAC contains the largest number of original articles ever contributed to this or any other similar annual volume. It is also enriched by an exquisite work of art printed by the Woodburytpe Permanent Photographic Company, the negative taken by Mr. J. W. Ramsden, of Leeds.

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METEOROLOGICAL REPORT,

For the Week ending January 7, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain fall
1	30·14	NW	38	40	50	36	—
2	29·92	SW	49	50	52	38	0·05
3	29·54	SW	45	47	49	43	—
5	29·95	NW	35	37	42	33	0·10
6	30·35	NW	34	35	45	32	—
7	30·27	WSW	38	40	—	33	—

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 715. Vol. XXI.—JANUARY 16, 1874.

REFORM IN THE PHOTOGRAPHIC SOCIETY.

Our readers are aware of the discontent that has long reigned among the members of the London Photographic Society.

This has been denied, but the feeling evinced at the meeting held on Tuesday evening last placed the matter beyond all doubt. It was more largely attended than usual, and almost exclusively composed of members. There was nothing in the special papers to be read to induce an unusually large attendance, but an impression existed that a communication would be made respecting the *two* requisitions which had been sent, since the last meeting of the Society, to the President and Council to call a special meeting to revise the laws. It was not incumbent to do so, but we think it would have been an act of courtesy, as well as one of wisdom, if official etiquette had been relaxed, and some reference had been made to these requisitions. It would have removed an impression, which we trust is erroneous, that the Council desire to obstructively oppose the desired reform. No such communication was, however, made.

The disaffection known to exist among the members at large, and to which frequent allusion has been made, is not, however, the immediate cause of the present combined action to effect reform; it had its origin among the members of the Council themselves. It is not necessary to allude in detail to the circumstances which convinced certain of these gentlemen that, so long as the Council is constituted in its present manner, they could not act in the way they deemed best for the broad interests of the Society. They felt, also, that it would be a pure waste of time to attempt to obtain a reform from within; they therefore determined to invite their fellow-members generally to co-operate with them in effecting beneficial changes.

Law vi. of the Society provides that when twenty members sign a requisition the Council *must* call a special meeting, at which alterations of the laws can be made. They started such requisition and quickly found the required number of signatures. The preamble of this requisition stated that the "undersigned" members were convinced that the interests and usefulness of the Society would be materially advanced by such a modification of the laws by which its elections are regulated as would give the members at large a more direct influence in its affairs; and they requested a special meeting to be called to consider how best the laws and practice of the Society could be directed to that end. The requisition was accompanied by a memorandum naming laws v. and vi. as those to be altered at the said meeting. On the assumption that such alterations might be made at the meeting as would necessitate the open election of all its officers for the ensuing year the memorandum named the nominations for such offices to be part of its business.

The requisitionists intentionally omitted the exact form in which they desired the reforms, and thought it better their fellow-members should take a part in deciding how to effect the changes. They thought what they desired might not be the best that could be devised, and they also thought it presumptive to dictate to their fellow-members. They did not, therefore, undertake to name how the laws should be changed, though at the proper time they would have been ready to submit their views to the meeting. The present law of the Society as to effecting alterations is loosely worded and ambiguous; but the interpretation the requisitionists placed on it they felt to be quite in accordance with its spirit.

This requisition was received by the President on December 24th, and on January 5th a special meeting of the Council was called to consider it. The decision of the Council was that the document was informal because it did not contain the specific laws proposed to be substituted for the old ones. This interpretation the requisitionists dispute; but, without surrendering their conviction, they got up a second requisition—this time signed by thirty members—in which they technically proposed the laws they would submit instead of the old ones they objected to. This second requisition was delivered at a special Council meeting called on January 12th, and as another Council meeting was held on the 13th, just before the regular meeting of the Society, it was not unreasonable to suppose the Council would have told the members whether they were going to call the special meeting or not.

It should be mentioned that at the special meeting of the Council of January 5th they invited a deputation of the requisitionists to wait on them and explain their views, in order to see if mutual action could be taken. The requisitionists declined a *private* interview, as they stated that they wished a public one, at which the members generally might attend, and not merely that section which formed the Council. In this latter proceeding we think the requisitionists were quite correct, particularly when the Council neither informed them whether they would or would not call a special meeting, but apparently, though not in words, proposed the alternative of a private meeting with themselves.

What the consequence will be of this second requisition will presently be seen; but the treatment which two members of the Council who signed the requisition received from their brethren was such that they resigned their seats the day following. These gentlemen are Mr. Matthew Whiting and Dr. Mann, one of the Vice-Presidents. For similar reasons Mr. P. Le Neve Foster, one of the founders of the Society, also found it necessary to send in his resignation of a seat at the Council and his membership of the Society.

FLUORINE AS AN ACCELERATOR.

Upon looking over some old memoranda relating to experiments in the preparation of collodion, which were made upwards of twenty years ago, we came upon one which may be worth some attention at the present time.

We find it noted that fluoride of potassium in very minute quantity was found to cause a very great increase in the sensitiveness of the collodion upon which we were experimenting, but that this advantage was destroyed by the fact that the introduction of it into collodion destroyed its power of adhesion, and that the film became loosened entirely from the glass plate and could not be washed without completely breaking up. This was deemed to be an irremediable fault, and the matter was forgotten by us altogether till we came across our notes the other day. The collodion which was employed in the experiments in question did not contain more than two grains of gun cotton, made at a low temperature, to the ounce of solvent.

Now that the preparation of photographic collodion is better understood, it might be worth while to institute a few experiments to ascertain how far the addition of a minute quantity of a fluoride into the sensitiser may not prove more advantageous now than in the early days referred to, when the preparation of gun cotton or papyroxyline for photographic purposes was very different to what it is at the present time. In the preparation of dry plates especially it might prove advantageous; and if found impracticable to add it to the collodion itself from its slight solubility in the solvent, it might be applied in the preservative with good effect.

Fluoride of potassium was employed by Mr. Hunt in the preparation of paper for obtaining photographic impressions; but we believe that its use has never been proposed in collodion.

PATENTED INVENTIONS.

No. II.—THE MOUNTING AND EXAMINATION OF PHOTOGRAPHS.

CONDENSATION is the order of the day. The once favourite *Peruvian bark* of times past is superseded by the *quinine* of the present. Formerly our richest liqueurs were made by the infusion of scented leaves and flowers; *now* a few drops of essence are used. Time and bulk are well-nigh annihilated, the principle of condensation pervading everything. Why should not photography, also, be brought under the influence of this dominant principle? One's friends sometimes get so numerous—speaking just now from the *carte*-portrait point of view—that no album will accommodate them. Can they not be condensed by some method analogous to that which Milton informs us was employed by the arch-fiend to curtail the dimensions of his numerous maleficent satellites so as to bring them all within reach of his voice? There is no reason why they should not, and there is certainly no difficulty that requires to be encountered in the method of doing so. Every person has heard of the pigeon postal system that was adopted during the siege of Paris, and how, rolled up in the barrel of a quill, communications, in which the reduction of words to microscopic proportions was fully carried out, passed to and from the beleagured city. Every person is, probably, also aware that a Benedict may have concealed in the central ornament of his breastpin a tiny spec which, under a magnifying glass, becomes expanded into a charming and distinct portrait of his wife and family. The art of condensation by means of photography is quite as well understood as the converse art of enlarging by its agency.

With these desultory remarks we introduce to notice a patent having reference to this subject. Messrs. Dallemagne and Triboulet, of Paris, commence by admitting that photography has been the subject of numerous ramifications and discoveries of late. Even as respects its amusing or instructive side they cite the interest created by the possession of proofs or pictures representing views of cities, monuments, and historical or other portraits. But at this stage the hiatus begins; for with much truth they say that in order to have a substantial collection a very considerable number of proofs are required, and, notwithstanding the cheapness with which they may be produced, it is nevertheless true that a choice collection is very costly, and the classification of each proof as regards dimensions very inconvenient. To the truth of this every photographer or connoisseur imbued with the amiable desire for collecting photographs will give a ready assent.

The remedy for this acknowledged inconvenience proposed by the patentees consists in having greatly-reduced copies made of the pictures, and these minute copies mounted side by side close to the margin of a circular plate of glass, which plate or disc must be perforated in the centre and mounted between two strong uprights, so as to be capable of revolving. An eyepiece or powerful magnifying glass is mounted in such a manner that when the eye of the spectator is applied to it each picture will be seen in rotation, so that, if there be a hundred pictures mounted upon the disc of glass, by causing the disc to rotate each will be seen distinctly when it is brought opposite to the eyepiece. Provision for ensuring that each picture will come to its proper place—and no further or less—is made by having a toothed wheel attached to the same axis as that to which the glass disc is fixed.

In the annexed diagram is shown a sectional view of the apparatus, in which D is a knob attached to an axle which carries, first, a large wheel, A, having as many teeth, or more properly *notches*, as there are pictures to be shown; and, secondly, the metallic disc C, to which the glass or picture-bearing disc is attached by a couple of screws. The spring shown at B acts in the teeth of the wheel, and ensures its stopping as each tooth passes the spring, thus preventing any picture from being only half seen owing to the disc not being moved to the proper distance. At G is shown the eyepiece, the magnifying power of which must be determined by the size of the picture to be viewed.

Having thus given a digest of the invention, we supplement it by an extract from the specification:—

"Take a glass of no particular size, but nevertheless not large, and furnish its circumference with a series of photographic proofs reduced to their smallest dimensions short of being of the kind known as microscopic; thus a considerable number of proofs may be set in line upon this glass, and if this glass is placed in any kind of envelope or casing, and a rotary motion be given to it, causing each of the proofs to pass successively beneath a magnifying glass, the conditions of the problem will have been fulfilled—that is to say, the assemblage of a certain number of proofs in a given space so that they may without trouble be seen successively.

"In order that in the rotation of the glass each of the proofs may come facing the lens a stop notch, regulated according to the position of each of these proofs, must arrest the rotation of the glass at each proof. This result is obtained by means of a toothed wheel A, the number of teeth of which has been calculated according to the number of proofs, and of a spring B, fixed to the casing. The toothed wheel is closely connected with a double plate C, pierced with two holes communicating with two others pierced in the glass, and through which pass two screws. The result is that if a rotary motion be given to the knob D, the glass, the plate C, and the toothed wheel A will follow this impulsion until it is no longer given, when the spring B, which has been made to yield, will stop the entire arrangement by resuming its position in one of the teeth of the wheel A. As above stated, this arrangement possesses the merit of causing the stoppage of each of the proofs.

"In short, this apparatus is composed of a number of protographic proofs placed circularly upon a plate of clear or of unpolished or ground glass, or other material which will render the same service, to which is given a rotary movement by means of the mechanism above described, or its equivalent, to cause them to pass successively beneath a magnifying lens.

"It will be understood that the objects to which this apparatus may be applied are susceptible of the greatest variety, and that the apparatus itself may be modified; thus it might be arranged so as to give stereoscopic effects by rendering it binocular.

"The glass above described may be replaced by an opaque body, upon which proofs would be placed, to be lit up by the reflection of a glass or otherwise.

"Transparent proofs might even be employed fastened upon the card cut out for this purpose. The card itself might be of a transparent material, such as mica or other similar body.

"Finally: the shape of the card might be modified from circular to rectangular; and in lieu of giving it a rotary motion it may be made to slide horizontally to pass in review the proofs drawn upon it.

"Having now described and ascertained the nature of the said invention, communicated to me as aforesaid, and in what manner the same is or may be performed, I would have it understood that I claim as secured to me by the hereinbefore in part recited letters patent, the combination of a series of reduced photographic pictures with a plate operated so as to bring the pictures successively beneath a magnifying lens, substantially as and for the purpose hereinbefore set forth."

Now, the idea of reducing photographs and mounting them in the manner described is a really excellent one. But we are at a loss to understand what definite meaning is attached by the inventors to the particular size of photographs described as being "reduced to their smallest dimensions short of being of the kind known as microscopic," because the fact of the employment of an eyepiece with which to examine the pictures prove them to be too small for comfortable examination without such optical aid. On the meaning that is to be attached to the phrase quoted above depends entirely the validity of the patent.

We have seen at scientific *soirées*, and standing publicly displayed on the counter of one of the leading opticians in Edinburgh (Mr. Bryson) an instrument precisely similar to that here described and patented; that is to say, consisting of a mounted glass disc, on the margin of which was mounted, side by side, a large number of photographs so much reduced in dimensions as to necessitate the use of a low-power microscope for their examination. Hence, assuming the instrument we and hundreds of others have seen "published," in the patent sense of the word, the whole matter rests upon this—To what degree of diminution may a photograph be subjected without its being reduced to the dimensions of "the kind called microscopic?" This question will be found to be a very difficult one to answer. A few days ago we received a copy of the *Pall Mall Gazette* reduced by photography, and we were unable to read any of it, the title excepted, until the sight had been aided by a strong magnifier. Now, is or is not this a microscopic photograph? or would it have to be still more reduced in dimensions before it could merit the application of that term?

Although the invention may not possess sufficient importance to warrant us in expecting to see a case of infringement of the patent brought before the Vice-Chancellor for adjudication upon its merits, there is no doubt whatever that upon the issue at which we have hinted there is room for an important display of forensic eloquence, from which might be extracted an elucidation of the funny questions—Wherein consists the difference between a magnifying-glass and a microscope? And at what precise stage does a photograph reduced enough for the action of the latter cease to be a subject for the former?

MAGNIFYING GLASSES FOR RETOUCHING.

It is a popular fallacy that a large magnifying glass is more powerful than a small one. *Power*, in a lens used for magnifying, or as an eyepiece, depends upon the degree of convexity of the surface—the flatter the curve the less being the magnifying power possessed by the lens. A very large lens, therefore, cannot be made to magnify so much as one having a small diameter, because a rounder curve—a shorter radius—may be imparted to the latter than can possibly be done to the former.

At the last meeting of the South London Photographic Society Mr. B. J. Edwards recommended as a magnifying glass for retouching a large lens, something similar to those used in the largest graphoscopes; that is to say, one through which any object could be viewed with *both* eyes, a desirable condition being that the axes of the eyes should not pass near the edges, but as near to the centre as possible. Now a lens of this kind implies a very slight degree of magnifying power, because of the necessarily large diameter. If it were made of such dimensions that the axes of the eyes would pass only through a position near to the margin, it would be nearly similar to looking through a prism—much confusion would arise in consequence of the colours; and yet, unfortunately, with a diameter so great as to prevent these fringes of colour being visible must be associated an increased radius of curvative, and a consequent loss of magnifying power.

Assuming that what is really wanted is the greatest possible degree of amplification combined with distinctness and the use of both eyes, the question arises—How can these be best obtained? It is a condition inseparable from the use of single bi-convex lenses used as magnifiers that the best definition is obtained by this agency when the axis of the eye and that of the lens are in unison; in other words, when the eye is directly opposite to the centre of the lens. At best, an approximation to this would only be obtained even if a magnifier of eight inches diameter were used. *Both* eyes could not utilise the centre at the same time; if one did, then the other would be away from the best position a distance nearly equalling that which separates the eyes.

Most fortunately, in the most humble, the best-appreciated, and most popular optical instrument in the world—the time-revered common spectacles—is to be found a panacea for all the evils attendant upon the use of a large lens without the sacrifice of a single advantage possessed by it. Is magnifying power required? Then seek it in a pair of "glasses" several degrees stronger than required for ordinary purposes. But what about the position of the eye relative to that of the axis of the lens? It is simply perfection. There being now not one, but two, magnifying glasses, each is brought opposite to the respective eye by which it is to be used; hence the axes of both correspond, from which follows, as a matter of course, freedom from the prismatic colours. The ordinary spectacles of everyday use, therefore, fulfil in the most perfect manner all the optical conditions required by the retoucher, who employs both eyes during his work.

One thing, however, must be noticed. If spectacles of the highest magnifying power—such as "cataract" glasses, or those intended for persons of ninety or a hundred years of age—be employed, it will not be possible to see with both eyes distinctly through them unless a certain expedient be resorted to, which can be deduced from the following considerations:—In looking through glasses of medium strength the eyes, if healthy, possess the power of adjusting their axes so as to converge to a considerable degree; but when glasses or spectacles of *great* power are used the eyes have not powers of convergence sufficient to meet the greater demands made upon them. To remedy this all that is necessary is that the spectacle glasses be mounted a little nearer together than usual, or so that there shall be a less distance between the centres or axes of the glasses than those of the eyes. We have obtained a pair of common steel spectacles with lenses of very short focus, and although they would not answer for giving a clear image when we first tried them, we have made them to suit by softening the bridge between the glasses in the gas flame and pushing the lenses closer together. We have now an optical instrument which magnifies more than the large lens recommended by Mr. Edwards for retouching, and gives a far brighter and clearer image than it can possibly do.

The perfection of a magnifying glass is, of course, only to be found in the use of a lens that has been achromatised. Let any retoucher or artist who desires to have the best possible definition use an achromatic lens. A large one is not necessary. We have been experimenting with one of two and a-half inches diameter, which, although too small to permit of both eyes being used with the lens placed close to the eyes, answers every purpose when it is held a short distance from the eyes, both of which may then be used. The front lens of even a French half-plate portrait combination gives in our hands a far larger and better detailed image than the best of several fine graphoscope lenses we have tried. Even the front lens of a quarter-plate combination will give a sharply-defined image when both eyes are used, care being taken to adjust its position between the eyes and the object under examination.

What has been said of optical applications to retouching applies, of course, equally to miniature painting, in which it is of the utmost importance to have purity of colour as well as mere magnifying power.

A curious and somewhat interesting case has been reported in the Paris journals. Dr. Tenting, an oculist practising in Paris, received the other day a visit from a young woman, named Marie Verdun, living with her mother in the Rue du Columbier, who was suffering from a very unusual form of disease called "nyotalope;" that is to say, she loses entirely the faculty of sight in the daylight and recovers it in darkness. Her eyes do not present any specially morbid character, but during the day time she is compelled to keep the eyelids closed, and covered with a thick veil. At night, or when the shutters of the room are perfectly closed, she reads and writes with perfect ease. She is said not to feel *pain*, but a feeling of great lassitude whenever the solar light falls upon the retina. The disease is a very rare one, and, from the impossibility of discovering the cause, a very difficult one to combat. We do not often draw the attention of our readers to medical questions; but to photographers a case of this kind must have a certain interest, as showing the abnormal action of light upon the optic nerve when its functions are disturbed by disease.

At the meeting of the London Photographic Society on Tuesday last a paper by Mr. W. H. Watson, on *Sepia-Toned Silver Prints*, was read. The author described very fully his mode of operating, the chief "novelty" in which was floating his paper upon the toning bath before applying it to the silver solution. He suggests the use of albumenised paper for the purpose, but seems to have quite overlooked the fact that a solution of acetate of soda, even with the addition of the usual quantity of chloride of gold, would have no effect in causing insolubility of the albumen, which latter would simply be dissolved away. It appears to us that the method virtually resolves itself into a suggestion to "salt" paper (and for this purpose plain paper would probably answer as well as albumenised) upon a solution of acetate of soda and chloride of gold, and then to silver in the usual way. We believe it to be pretty generally known that Mr. Hennah, of Brighton, used to employ a process very similar to this for the production of prints the tone of which was exceedingly beautiful, except that instead of acetate of soda he employed chloride of sodium or ammonium, with the addition of chloride of gold. The use of acetate of soda, converted subsequently into acetate of silver, would, doubtless, materially alter the colour of the print obtained by its use. Paper prepared in this way will not keep more than a few hours. No specimens of the results were presented to the Society or exhibited to the members; we have, therefore, no means of forming a judgment upon the plan suggested. We are in a position to state that one of the best-known manufacturers of albumenised paper purposed some years ago to introduce chloride of gold into the preparation of paper in the process of albumenising, so as to obviate the necessity for its employment subsequently; but it was found that paper so prepared would not keep, the organic matter doubtlessly reducing the gold salt, and causing discolouration of the paper.

DRY PLATES WITHOUT WASHING.

Without doubt the highest point to be attained in the simplification of the process of preparing dry plates is the production of an emulsion containing its own "organifier," and which, after being spread upon a glass plate or other support, requires no further treatment in the way of washing, &c.

Such an emulsion has long been sought after by others as well as myself, but I fancy the notion has long since been relinquished as chimerical; in fact, Mr. James Mudd some years ago, in his *Photographer's Dream*, ably caricatured the idea in his description of Mr. Somebody's process, which consisted in mixing the whole of the chemicals requisite for the production of a negative—from the plate-cleaning solution to the hypo.—and coating a plate with the resulting compound. This problem has already been solved, without going quite so far, by the introduction of the gelatine emulsion; but, to many, the difficulty in preparing and drying these plates will be a serious objection—perhaps too great in proportion to the advantages to be gained. I purpose describing a collodion emulsion I have succeeded in working out which perfectly fulfils the object I had in view, namely, the preparation of dry plates in the single operation of coating without any further washing or "organifying." Other advantages I shall mention as I proceed.

First: allow me to review the difficulties which have hitherto stood in the way. In the front rank I place the difficulty—I may say the practical impossibility—of so exactly hitting the exact combining equivalents of the salts used in sensitising as to have neither in excess. If the soluble bromide be in excess the resulting plates would be very insensitive; and, even in the event of a sufficient exposure having been given to produce a picture if developed at once, the latent image would be rapidly destroyed by the free bromide if any length of time were allowed to elapse before the performance of that operation. If, on the other hand, the silver be in excess, it becomes necessary to employ a "restrainer" in the shape of a mineral acid, and this, I take it, is quite as dangerous as free bromide in an impressed film. Another difficulty arises from the presence in the emulsion of the nitrates of ammonia and cadmium—the products of the double decomposition of the silver nitrate and the soluble bromides. These, though probably quite innocuous from a chemical point of view, form star-like crystals over the whole surface of the dried film. Then, again, care is not always taken in the selection of solvents free from water, and by many water is used to assist the solution of the silver nitrate in sensitising. A plate prepared with such an emulsion, if dried without previous washing, would exhibit streaks of unequal evaporation—a dewy mist remaining on the film when it is otherwise apparently dry. It is needless to remark upon the character of such a plate after thorough desiccation. In the ordinary emulsion processes these difficulties disappear. The excess of silver or bromide, as the case may be, together with any crystalline matter contained in the film are removed in washing, and the volatile solvents, if not entirely washed out, are diluted to such an extent as not to interfere with the uniform drying of the plate.

What we require, then, is an emulsion which shall contain as nearly as possible pure bromide of silver, with a total absence of crystalline matter and of water. Some substance must also be added as an "organifier" or preservative, and to fill up the pores with soluble matter to enable the developer more readily to permeate the film.

I will now proceed to describe the means by which I attain the desired result, premising that no new chemicals are used in the operation, nor is any delicate manipulation requisite, such as might place the process beyond the reach of an average worker.

In the first place, the emulsion is to be sensitised in the ordinary way, no particular formula or method being recommended as better than another. In this matter each person may employ his own pet formula. It matters but little whether the bromide or the silver be in excess—whether nitric acid or uranium be used, or both; the only requirement is an emulsion that *will work*. Such an emulsion having been made, it is poured on to a glass plate edged with paper so as to form a dish, and allowed to "set," after which it is washed thoroughly and then dried. The dried product will consist of pure silver bromide and pyroxyline (the latter having probably taken into combination a portion of the silver used in sensitising), and when re-dissolved in equal parts of absolute alcohol and ether, of s.g. ·725 to ·730, forms an emulsion containing only *pure bromide of silver*. In this state it may be used wet, or may be washed and "organified" in the usual way. The addition of a suitable substance, however, renders it quite independent of any "outside" assistance, and completes what may, I think, fairly be called a "perfect" emulsion. The preservatives I have used with success are soap and tannin, both singly and combined—the former being the more sensitive, and the latter conferring greater vigour on the picture.

By many it will be said—"What a roundabout way of making an emulsion! and what a waste of ether and alcohol!" I would remind them, however, that in the washed and dried collodio-bromide they have ready to hand, and in a convenient form, the means of forming an emulsion at any time on the shortest notice; that it is no more trouble to prepare sufficient for a pint of emulsion than to prepare an ounce; in fact, in one operation sufficient may be sensitised to last a whole season, as in its dried state there is no reason why it should not keep good for years. Moreover, the emulsion is always uniform in sensitiveness, and, last, but not the least advantage, no washing is necessary; the plates may be coated and put direct into the slides. As regards the waste of solvents, I calculate in my method of working that the emulsion costs me about *fourteen pence per pint* more than in the old style. Surely the time saved in using twenty ounces would repay the fourteen pence.

I shall be compelled to postpone until next week the working details of the process; but I have given above such directions as will enable any intelligent person to work this new method. I would strongly impress upon all who may try it to follow the instructions I have given as to pouring out the first emulsion *and allowing it to "set" before washing*. On no account should it be precipitated by the addition of water, as by that means not only is the precipitate less convenient to handle in the subsequent washing and less permeable to water, but a part of the pyroxyline is lost—the more soluble portions being washed away, and the character of the film, when re-dissolved, entirely altered.

The finished emulsion, I find, gives a smooth, hard, structureless film, which adheres firmly to the glass. The developed image is clean and astonishingly free from spots. If properly filtered and kept clear of dust, it is impossible to imagine where spots or pinholes could originate in the absence of any particles of undissolved silver or other crystalline matter. The sensitiveness of the plates is very good. I have given one minute's exposure on a dull day this month with ordinary single stereo. lenses, and have obtained a negative full of detail in every part. From three to ten seconds, according to the negative, I find sufficient for printing transparencies by gaslight. As a test, I attempted one evening last week an instantaneous exposure to gaslight, using a portrait negative of medium density.

The exposure was given by turning the gas down as low as possible, and, after placing the printing-frame in position, turning it up and down again as rapidly as possible, the exposure probably lasting half-a-second. The result was to my astonishment a print vigorous enough for a lantern picture and quite clean, though I had to force the development.

The time occupied in preparing the plates is necessarily short. Preparing a dozen plates with a friend, a few evenings ago, the time expended in the operation (from commencing to coat the first plate to the time the whole of them were in the plate-box) was just *seventeen minutes*, the plates having been dried by artificial heat.

Next week I purpose giving a full account of my working formula, and many little details connected with the manipulations of the dried film. Meanwhile, I hope some few experimenters may turn their attention to this simple process. W. B. Bolton.

THE BEST WAY TO MAKE ENLARGEMENTS.

[A communication to the South London Photographic Society.]

In opening the discussion this evening I propose to say very few words on the subject of *Direct Pictures* versus *Enlargements*. The arguments in favour of enlarging from small negatives have been so ably stated by Mr. Croughton in his paper read to you at the last meeting, I have little to add except to call your attention to one important advantage in favour of enlargements which Mr. Croughton has entirely overlooked. I allude to the power of securing at will that diffusion of focus so essential in a large picture. It is well known that, owing to optical difficulties, it is impossible to produce large direct portraits with anything approaching perfect diffusion of focus in the various parts of the picture. Notwithstanding all that has been done by our best opticians in getting rid of the painful sharpness in one plane caused by over-correction in large lenses, a large portrait taken direct in the camera must always, in the nature of things, be considerably out of focus in some more or less important parts of the picture. By adopting the plan of enlarging no such difficulty exists; provided the original negative be tolerably well defined any amount of diffusion can be readily obtained at the will of the operator. I shall have the pleasure of showing you some examples of this in the negatives I have brought for your inspection.

With regard to the best way of making enlargements: this is a matter to which, as you are aware, I have devoted a good deal of study and attention. I think I may claim a large share in forcing the subject upon the notice of photographers, having been, perhaps, the first to demonstrate before the members of this Society that enlarged negatives could be made to produce prints equally as perfect as the originals. It is, however, with much diffidence that I offer any remarks this evening, inasmuch as my process is what is termed a "secret process." I have never myself so called it, and I think you will agree with me that as it is already in the hands of more than 200 professional photographers in this country it is hardly entitled to be termed a secret process. My desire is that it should be still more widely known. I should like to have every intelligent photographer in the kingdom for a pupil and a subscriber. I have, however, no wish to make this Society the means of a trade advertisement. The fact that a member of our Council, who is also professionally engaged in making enlargements, has so eloquently advocated his particular views as to the best way to make enlargements must be my excuse for the few words I shall offer. While I cordially agree with Mr. Croughton on the many advantages of enlargements compared with direct large pictures, I must entirely differ from him as to the best means of producing the desired result.

Mr. Croughton, in his paper read at the last meeting, did me the honour to quote some observations of mine on a former occasion, in which I pointed out that he was in error in two important points in his method of working. He also, I understand, showed examples of his "double mistake." I have not had the pleasure of seeing those results, and must plead guilty to the charge of still holding the opinion that the method advocated by Mr. Croughton is wrong, both in theory and practice. First: with regard to the use of wet collodion for the immediate transparency, or positive *cliché* (I use the French term as being more expressive and appropriate), throwing aside the plea urged by Mr. Croughton "that it is so very convenient," I need only point out that for many years the ordinary wet process has been used for this purpose. It has been the rule, almost without exception; and yet it is only very recently that enlarged prints have been shown which will at all bear comparison as untouched photographs with the prints from the original negatives, and in every instance where the untouched enlargement is as perfect as the small print I will venture to assert that the positive *cliché*, no matter what process was used in its production, was not made on wet collodion. Why this is I shall not now take up your time in discussing. I have a theory on the subject which I may at some future time inflict upon you; at present I will simply state, as the result of my experience, that in order to produce the best results the transparency or positive *cliché* should be so perfect in texture that no human hand—not even the skilful fingers of a professional retoucher—can hope to mend or patch its exquisite gradation.

Mistake No. 2 consists, as I have said, in retouching an enlargement when the work required can be done better and quicker on the small negative. This subject of retouching is a difficult and much-vexed question; it seems impossible to determine how much or how little is a fair and legitimate part of the photographer's business. My maxim is—do no more than is absolutely necessary. We should all be glad to do without the retouching pencil altogether, and produce absolutely perfect negatives direct in the camera; but, as Mr. Croughton plaintively observes, "people will have freckles and blotches," and they must be got rid of by some means. But how? Mr. Croughton's advice is—first make your freckles and blotches from four to sixteen times larger, and then proceed to fill in or touch them out in the enlarged transparency. On the same principle, I suppose, a tailor, in order to mend a rent in a coat, ought previously to make the hole sixteen times as big, and then proceed to mend or patch it. I confess I cannot understand what advantage would be gained, unless the object be to show the patch. There is yet another reason why retouching should not be done on the positive transparency. It is well known that freckles and blotches, owing to their non-actinic colour, invariably photograph darker than in nature. How this can be remedied by adding more colour or blacklead without degrading the other and purer parts of the picture I must leave to Mr. Croughton to explain.

One word more on the subject of retouching. A curious misconception seems to have arisen as to the amount of retouching used in the pictures I had the honour of showing at the last Exhibition. I have this evening brought you a number of the large negatives that you may judge of the amount of labour expended in this direction. I have also brought untouched proofs from the same. You will notice that, with one or two exceptions, the negatives are almost untouched. The enlargements being made from ordinary card negatives used for silver printing, and not made specially for enlarging, any good printing negative will make a good enlargement, the peculiar effect of fine finish which appears to have deceived other good judges bes ides our friend Mr. Croughton being due to the nature of the transparency and the method of producing the enlargements.

B. J. Edwards.

ON THE PART PLAYED BY IODIDE OF SILVER IN WASHED FILMS; AND ON THE USES OF AURINE.

What part does iodide of silver play in a film which has been washed from all free nitrate? Does it really contribute to the formation of the latent image, or does it merely act as so much yellow colouring matter, lengthening the exposure and preventing flare?

The above is an important question, lying at the root of our theories of dry and moist films; and I have endeavoured lately to find a satisfactory answer to it—not by abstract reasoning, but by careful experiments, which I will now describe.

The three following collodions were used, namely, one containing five grains of iodide of cadmium only per ounce; another containing five grains of iodide and three grains of bromide of cadmium; and a third containing three grains of bromide of cadmium only. In every case the same thirty-grain nitrate bath was used, and a developer composed of pyrogallic and acetic acid, in the usual proportions for wet plates.

The iodised and bromo-iodised collodions both gave good results when exposed in the usual way—wet, as they came from the bath; that is to say, the chemicals were in perfectly good order.

I next prepared a plate with the bromo-iodised collodion, and after washing it well during five minutes, so as to remove every trace of free nitrate, coated it with a preservative composed of albumen one part, water three parts, and exposed it at once. It was developed immediately after exposure by first washing off the albumen, and applying the acid pyro. and some silver. A good negative was the result.

To the two wet plates I had given one minute's exposure, and to the washed plates five minutes. It now remained to try the crucial experiment with the simply iodised collodion, having washed all the free nitrate from the film, as in the last case, and coated it with diluted albumen.

Foreseeing that it would be less sensitive than the washed bromo-iodide film, I gave to one half of the plate an exposure of ten minutes, and to the other half an exposure of one hour.

On developing it with pyrogallo-nitrate, as before, no trace of an image could be obtained on either half of the plate, even when greatly forced with repeated doses of silver, excepting only at one corner where the collodion had been poured off, and where, probably, a little free nitrate still lurked and rendered the film sensitive. In that particular spot a trace, only just faintly visible, of the sky cutting against a roof could be detected by the aid of a magnifying glass.

I conclude, therefore, that iodide of silver without free nitrate plays no part practically in the formation of the latent image upon a washed bromo-iodised film; and that the latent image exists solely in, and is formed solely by, the action of light upon the bromide of silver.

Lastly: I exposed the bromised plate (made with collodion which contained only three grains of cadmium bromide, and no iodide, per ounce) for five minutes, after washing the film and coating it with diluted albumen. It yielded an over-exposed negative, very dense, but sadly afflicted with flare, owing to the extreme thinness of the film and its white colour.

It seems, therefore, that the part played by the iodide of silver in washed bromo-iodised films is simply to act as inert yellow colouring matter in preventing flare, whilst at the same time it lengthens the exposure.

There is no doubt that iodide of silver is, for this purpose, very convenient, because it is so readily dissolved out by the hyposulphite; but the question arises—May not some other inert yellow colouring matter be found which would answer equally well and be less costly, and, I may add, less risky; for the presence of iodide of silver in the film is fatal to the good keeping properties of the plates if any free nitrate be left in them, besides rendering the use of very pure water for washing indispensable?

Aurine being a substance which may be introduced into collodion, I added some to some bromised collodion containing twelve grains of cadmium bromide per ounce, and made several experiments with this orange-coloured collodion, excited with an eighty-grain bath, and developed by the alkaline method. Magnificent negatives, *entirely* free from flare, were produced; but, unfortunately, the exposure was greatly prolonged, so that instead of five seconds' exposure I had to give forty, the common wet process requiring at the same time sixty. The bath, also, was coloured yellow by the experiments, but this does not seem to have injured it at all. The way in which I finally removed the orange-coloured aurine from the film of the finished negative was by simply pouring a little alcohol over the film after it was fixed and washed. The yellow colour was thus wholly removed with great ease.

As a practical result of these experiments I am induced to recommend to my readers, as a substitute for the bromo-iodised collodion commonly used in the preparation of moist and dry plates, aurinified collodion, bromised only—the rest of the process remaining the same. The rapidity of the plates will depend mainly upon the quantity of soluble bromide per ounce which the collodion may contain, and on the corresponding strength of the bath in order to sensitise them properly. I believe that in this way a sensitiveness quite equal to that of good wet collodion may be gained for dry plates, without any of that unfortunate risk of flare or blurring which is the sad drawback of the very rapid bromide plates when the view presents great contrasts of light and shade. The quality of negatives produced by aurinified collodion is, so far as I can judge at present from half-a-dozen trials, very fine. The lines are firmly cut, the sky is evenly opaque, all the different gradations are well rendered, and there is absolutely no flare. In short, aurine appears to me to add another string to our bow, and I beg publicly to thank Mr. H. Cooper for the suggestion of its use. I shall have to report, however, from time to time how my yellow bath continues to behave; but it will be remembered that organic impurities in the bath do not seem to be so fatal to bromide as to iodide films. It remains also to be seen what may be the effect of aurine in the film as regards its adhesion to the glass in the dry process. If it should enable us to dispense with a preliminary coating, what an immense gain that will be! And why not, since it is a resinous substance, and resin in collodion has been already proved to have that good effect?

My readers will, I hope, clearly understand that I recommend aurine as a *substitute* for iodide of silver; the two must not exist together in the collodion, because organic matter should never be added to a film containing *iodide* of silver until *after* the removal of the *whole* of the free nitrate. It is organic nitrate remaining in an iodised film which leads to a host of troubles.

The object of aurine is to render rapid bromide films, either moist or dry, suitable for ordinary views by conquering the tendency to flare. It will also obviate the necessity for a red pigment at the back of the plate and, let us hope, also for a preliminary coating.

THOMAS SUTTON, B.A.

THE PROGRESSIVE RESULTS OF THE PAST SESSION.

[A communication to the Edinburgh Photographic Society.]

I FEEL very much inclined to ask you to turn up page 27 of last year's volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, and take what you will find stated there of 1872 as equally applicable to the year just closed. So little real progress has been made, either in the theory or practice of photography, that I really think this paper should have remained unwritten. I suppose, however, that there is in the Edinburgh Photographic Society, and in many other societies, a certain degree of conservatism which is unwilling to allow any time-honoured habit to pass away, even when the causes which brought it into existence have long ceased to be; and, recognising the duty of obedience to those in authority, I consider the request of our Secretary equal to a command, and so hasten to obey.

Collodio-bromide has, as usual, occupied a large share of attention, but little that is new has been brought to light. The necessity of a suitable pyroxyline has become more generally believed, and the conditions necessary for its preparation are better understood. Probably the greatest step in advance has been the introduction by Colonel Stuart Wortley of his strong alkaline developer. It passed off, as most good things do, at first with comparatively little notice, but gradually it began to find favour, and is, I should think, now adopted by all emulsion workers; and, if I may judge from my own experience, those who give it a fair trial are not likely to give it up.

Mr. Sutton has written with a zeal worthy of a better cause in favour of his moist bromide process. Since its introduction he has hardly allowed a number of THE BRITISH JOURNAL OF PHOTOGRAPHY to pass without some allusion to it; and I really was glad when I read his letter of December 12th, in which he promises to "drop the subject." If we are not able to progress, do not let us retrograde, as we should certainly do if we return to the moist messes of a bygone period; but of that I have little fear, as I do not think that any man who has mastered dry-plate work, and who can produce the exquisite results that it certainly can be made to give, will ever think of messing with a moist film.

How many photographers continue to lose their tempers and their time over fogged plates, by trying to develope in a light that contains too much actinism! And how often do we hear the question—"What kind of glass is best suited for the dark room window?" If those unfortunates would only read the short letter of twenty-three lines, written by Mr. P. Le Neve Foster in THE BRITISH JOURNAL OF PHOTOGRAPHY of January 10th, 1873, and invest a few pence in a very common prism, their troubles would vanish like mist in sunshine.

The question of shortening sittings by primary or secondary exposure under coloured glass continued during the early part of the year to attract some attention, but I do not think Mr. Newton has made many converts. My own experiments seem to show clearly enough that the only benefit derived from such exposure is the slight fogging of the shadows, which prevents an under-exposed negative from printing so intensely white and black as it would otherwise do. This, of course, is a real gain; but it is better to attribute it to the proper cause.

The introduction of gelatine as a substitute for collodion in the emulsion process is deserving of particular notice. Although no really workable process has been published, there is every reason to expect that it contains all the elements of success, and I have no doubt that before the year is ended it will take a high place amongst dry processes. I would, however, direct special attention to Mr. Sutton's suggestion at page 457 of the last volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, to make sheets of sensitive gelatino-bromide tissue. This is, I think, not only practicable, but likely to be one of the most valuable suggestions that has been made since Archer hit on collodion. I hope all who have time will turn their attention in this direction, and that before the season for field work comes round such tissue will be a recognised article of commerce. If I were disposed to don the prophetic mantle it would be to say that, if I am spared to write the "progressive results" of 1874, I shall have the pleasure of showing that the problem of instantaneous photography has been solved by the happy union of Sutton's sensitive tissue and Wortley's strong alkaline developer.

I am sorry to say that the question of how to make permanent sensitised paper is not yet solved. There are now several makers in the field, but they keep their methods to themselves. The subject is surely worth the attention of experimentalists, and cannot be so difficult as to deter them from the investigation. I wonder whether, if the various photographic societies throughout the country were to join in offering a suitable medal to the discoverer, we should get the desired information, and think it is worth a trial.

In carbon printing there has been nothing new of importance, but a large increase in quantity, considerably improved in quality, has been done by the now well-known methods; and there can be little doubt that ultimately silver printing must go to the wall. In connection with this matter mention may be made of the two processes introduced by the late M. Marion in the middle of last year. They seem, however, to have been unworkable, or, at least, to have died with their inventor.

This review would hardly be complete without including a word or two about the Crawshay prizes for large heads. The exhibition of prize pictures gave rise to a little ill feeling and a good deal of stupid writing; but, on the whole, it must have an influence for good. Direct large pictures are worthy of more attention than they have yet received, and I have no doubt that the next exhibition will show much improvement in quality, and, I hope, also in quantity. If, however, the competing pictures are to form part of the Photographic Society's exhibition, I would strongly recommend the Council to consider whether it would not be advisable to limit each exhibitor to three specimens. Too much of even a good thing is never good.

And now, in conclusion, let me bear an humble protest against what I cannot help calling a desecration of our art in high places. I allude to the widely-published information that the Shah, while residing as our guest in one of our royal palaces, found a photographer who, instead of obeying the good old injunction to "remember the Sabbath day," did not disdain to take rank amongst those pariahs of our art who, by their unblushing, open desecration of the Sabbath, do their best, or, rather, their worst, to bring disgrace on a noble profession. JOHN NICOL, Ph.D.

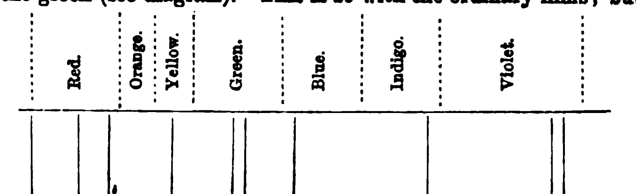
DR. VOGEL ON THE SENSITIVENESS OF BROMIDE OF SILVER TO THE SO-CALLED CHEMICALLY-INOPERATIVE COLOURS.

THE rapid strides which have recently been made in the direction of greater sensitiveness of films, of new substitutes for the old means of obtaining light impressions, and of new combinations of old agents, suffice to prove how really progressive photography is. The fashion was to cry down its progress some years ago. Nothing was left worth finding out; but the changes which are taking place on every side—the peeps which we begin to get into new fields and almost infinite possibilities—warn us that such ideas were wholly erroneous. Of this scientific revelation also we may truly cry "*ça ira!*" and what photography will yet do pictorially and scientifically he would be a bold man who would venture to say.

Amongst those who are contributing to these changes by their diligent research Dr. Vogel holds a conspicuous and honoured place. His *Mittheilungen aus dem Photographisches Atelier der Königliche Gewerbe Akademie* are often valuable and always interesting, such at all times as make us desire that we had in this country distinctive scientific acknowledgment of the value of photography as a scientific handmaiden. The mere accurate tuition in processes is not what is most wanted with us, but a constant following out of hints and faint traces of possible results, regardless of the immediate practical end. There is, we believe, no adequate provision in this country for any thing of the kind, and we think this is matter for regret.

But leaving this, we now turn to see what Dr. Vogel has to say upon the subject at the head of this article. As he well remarks, every photographer knows to his cost how certain colours—such as red, yellow, or green—are almost or altogether photographically inoperative. This defect haunts the photographer, not in one line only, but everywhere. It may be most in the way in copying oils, but it also interferes with copying the human face and figure. Colour of clothes, a sallow complexion, blonde hair, red cheeks, are abnormally rendered on the plate. A light, if tinged with yellow, appears as a shadow, and a dark place as a light should it be tinged with blue; and it is only by retouching that things can be in any measure equalised again.

These abnormal renderings, as they may be called, of the colours by photography are most strikingly manifested when brought to the test of the spectrum. As Dr. Vogel has proved by experiments, the sensitiveness of a film to the visible spectrum, even when the violet end has been fully exposed, reaches no farther than the line E in the green (see diagram). This is so with the ordinary films; but



recent investigations with bromide of silver alone have shown that not only can sensitiveness be made to reach very much farther, but that by certain means it can be extended even as far as the red—that is, to a point where for ordinary photography absolute night reigns. From some experiments made by Dr. Vogel months ago with Colonel Wortley's dry plates he found to his surprise that the spectrum at the line E in the green seemed as sensitive as the line F in the blue. This was something contrary to all experience—a reversal almost of the usual order—and he conjectured that it must be in some sort owing to the alkaline method by which these plates were usually developed. In order to make this point clear one of the Wortley plates was exposed on the spectrum and developed in the ordinary acid way with protosulphate of iron and silver. The result was an image which was in truth much weaker than those developed with alkali, but which exhibited distinctly the same characteristics, being, in fact, stronger in the green than in the blue. It was noteworthy, however, that all the Wortley plates did not display the peculiarity, and, consequently, a closer examination into the action of the spectrum colours on bromide films was necessary to clear this anomaly up. The first thing, of course, was to use plates of his own preparing, and these behaved quite differently from Colonel Wortley's.

The bromide plates were tried in two ways—*first* wet, or taken from the silver bath, and *next* dry, that is, with the free silver all washed off. They behaved differently. The dry plates showed a further extended line of sensitiveness than the plates covered with free silver. With the latter an ordinary acid development gave an image which reached only to the yellow—that is, to the middle between the line D and E; but with the same treatment the image on the dry plate went as far as the orange, and the quality of the result was very divergent. With the wet plates the greatest action appeared in the blue and indigo between the lines F and G, but it failed suddenly at F, and only a feeble shimmer appeared between that and the E in the green. On the other hand, dry plates gave a much feebler image in the blue, but, gradually decreasing, it extended beyond D into the red. Hence, it is inferred that bromide of silver dry plates are more sensitive for the photographically-weak or less refrangible rays, and wet ones for the more refrangible blue rays of the visible spectrum.

For ordinary photographic plates it is notorious that free silver in solution on the surface of the film is looked upon as a powerful help to sensitiveness; it strengthens the development, because it chemically holds the iodide or bromide set free by exposure. If the action be strongest in the blue ray, at all events, it is also true that it is increased if a wet film be used. As Dr. Vogel has before now pointed out in his researches into the action of iodides, a foreign substance can help to increase their sensitiveness; besides merely holding the iodide, it absorbs the chemical rays. Hence, the iodide-holding dry pyrogallic acts as an excellent sensitiser, but the solution not so, because then the chemical rays are suffered to stream through unabsorbed. Optical and chemical conditions must, therefore, work together in order that any body may be made valuable as an auxiliary sensitiser.

As already remarked, the sensitiveness of the dry bromide plate extends in a gradually-decreasing ratio from the blue to the red. Of the singular anomaly in the English plates—a decrease of the intensity of impression towards the violet and an increase towards the red—Dr. Vogel saw no trace in those prepared by himself. It was, however, very evident that free nitrate of silver exercised an important effect on the sensitiveness of bromide plates.

Wortley plates ostensibly contain uranium, gum, and gallic acid, and, perhaps, a yellow-coloured substance as a surface coating. In order to see whether this coating had anything to do with the peculiarity in question, Dr. Vogel washed one of the plates with alcohol and water, and obtained by this means a film which was simply like an ordinary one, and showed no perceptible sensitiveness beyond the green. Therefore, he concluded that the substance thus added to the film possessed some property of arresting these less active rays and increasing their action. But the better to test this it was necessary to establish the fact more precisely, and so an effort was made to impregnate a bromide plate in this manner with a substance calculated to heighten the sensitiveness of the film towards the red end of the spectrum. Coraline was selected as being likely to have such an effect; but when tried it was found to give a very feeble image between the lines D and E, and therefore it absorbed the yellow and yellow-green colours. The impression of the blue was also perceptibly weakened. If the sunlight were allowed to act upon a film thus prepared before it was exposed to the prismatic rays the yellow and green failed to appear, provided the solution of coraline was sufficiently concentrated. In this plan there was visible merely a dark strip.

Subsequently Dr. Vogel dissolved coraline in alcohol, and added to it his bromised collodion until it became of a strong red colour, and with this mixture prepared some dry plates, which had also a distinctly red appearance. When exposed they gave the following singular result:—The film showed strongly sensitive at indigo, and from there to bright blue its sensitiveness decreased, being weak at F. From there it began to increase again until in the yellow it was almost as strong as in the indigo. Thus a means was found whereby bromised silver plates might be made extremely sensitive to the ordinarily-esteemed insensitive colours.

The next thing was to try and light upon something which would have the same effect with the red rays, and this Dr. Vogel succeeded in finding in the green colouring substance of aniline. This absorbed powerfully the red rays between the lines D and C; the absorption extended further than D with greater concentration, and yellow, green, and blue were almost equally manifested. Thus with a green-coloured collodion were the red rays also seized. The sensitiveness gradually lessened toward the indigo, was almost *nil* in orange, and showed powerful action in red. From all these researches Dr. Vogel concludes that we are on the way to a point at which it will be possible to render bromide of silver sensitive at pleasure to any kind of colour desired or necessary. As far as things have gone it is noticeable that what will have the effect of absorbing one colour will leave another untouched, and that, therefore, to use this power well it is necessary to select for a given subject the adjunct best suited to it. That done, the till now disturbing insensitiveness of certain hues may be no longer regarded. How far things may be modified in this way is visible from the following instances:—A photograph was taken to be of a blue line on a yellow ground. With an ordinary iodide of silver plate one would have obtained simply a white strip on a black ground. With a bromised plate coated with a coralinised collodion, on which both blue and yellow are very sensitive, there would have been no variation in the image whatever. A yellow glass was therefore placed before the lens; this absorbed the blue rays, but suffered the yellow to pass through quite freely, and a plate so taken developed a *dark band on a bright ground*, thus precisely reversing the ordinary result.

And the thing is not merely of technical but also of scientific interest. Until now it has been the belief that the haloid salts of silver only were altered by the chemical rays, that they most strongly absorbed them, and the extension of the area of sensitiveness was denied. The researches here set forth prove such ideas to have been fallacious; for not only the colour-absorbing power of the silver salts themselves, but also that of many auxiliary substances combined with them, play a very important part. The vista opened up here is, therefore, a most interesting one; and we may hope that not Dr. Vogel only, but chemists interested in the progress of photography everywhere, will do something towards exploring this field, to which the remarks now before the reader are the merest introduction. Well may Dr. Vogel say that *ein hoffnungsreicher Blick*—a rich hope-glimpse is opened into the future of our art by this hint of the possibility that all the annoyances due to the false rendering of colours may be got rid of.

A. J. W.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 20	Bristol and Clifton Amateur .. (Annual Meeting.)	Philosophical Institution, Clifton

LONDON PHOTOGRAPHIC SOCIETY.

The usual meeting of this Society was held on Tuesday evening last,—James Glaisher, Esq., F.R.S., President, in the chair.

The minutes of the previous meeting having been read,

Mr. Stillman objected to their accuracy. Certain things, he said, had taken place at the previous meeting which were neither entered upon the minutes nor were they to be found in the transactions of the Society in their own journal. He found in The British Journal of Photography of December 12th a report of something that was alleged to have occurred of which no notice had been taken in the minutes, and he objected to them until they had been supplemented by that matter. He referred to a certain question put by Colonel Stuart Wortley which the Secretary had not answered. He handed to the Chairman a copy of The British Journal of Photography containing the report in question.

The Chairman (throwing the publication down) said he would not receive what had been reported in a commercial publication.

Mr. Sawyer begged to endorse what Mr. Stillman had said. There was an important discussion which was not referred to in the minutes or in their journal. Colonel Wortley's question was quite a fair one, and he had not been treated by the Secretary with due respect.

The Secretary explained that he was unable at the time to reply to the question, but he had afterwards written to Colonel Wortley.

Mr. Spiller said that he was chairman at the last meeting, and the question was such a large one that it might have occupied the entire time of the meeting in discussing it. He then stated the question that had been asked. [*Vide* our report of the meeting.]

The Chairman said the question was a proper one to be put at an annual, but not at an ordinary, meeting. As a matter of courtesy he would have replied to that question as fully as possible, but as a matter of right he would not have done so. The principle adopted in determining the retirement of members of the Council was that each might consider himself elected for two years at anyrate, and then to be set aside for retiring if he had not attended to his duties. Mr. Crawshay, for example, who was deaf and could not attend the meetings, would be on the retiring list next year, having fulfilled his two years.

Colonel Wortley said that his question was to the effect that, in order to afford the members an opportunity of properly aiding in the election of councillors, the Secretary would inform them on what principle certain members of the Council were made to retire, and whether information would be given as to the regularity of attendance at the Council meetings of the various members, so as to enable the members of the Society to determine how far they approved of the nomination of the Council. Although Mr. Pritchard had not answered his question at the time it was put, he had afterwards written a most courteous letter to him on the subject.

After a prolonged discussion it was ruled that the omission complained of be embodied in the minutes, which was accordingly done, and the minutes were confirmed.

Messrs. Werge and Bird were appointed auditors.

The following gentlemen were elected members of the Society:—Colonel Maud, Lieut. Chermside, Messrs. W. N. Hartley and R. V. Harman.

Mr. Jabez Hughes said that the present evening was that upon which the members of the Society were permitted to propose a different list of officers and council from that nominated by the Council, and he begged to hand in a list of nominations for the vacant offices for the ensuing year. He had supplied an omission in the Council's list, inasmuch as he had proposed a candidate for the presidency. He then read the commencement of law vii. of the Society, which states that every officer of the Society, with certain reservations which did not apply to the President, should be elected annually, and unless a candidate for this office had been provided the Society might, by this omission of the Council, actually be for next year without a president.

The President interrupted Mr. Hughes, stating that his predecessor, the Lord Chief Baron Pollock, had told him that he had been elected to the office of president for life, and the same applied to his (Mr. Glaisher's) election. He had replied that he thought this was injurious, and in reality he had more than once placed his resignation in the hands of the Council; but there was no doubt whatever that when they placed him in that office they did so for life.

The names proposed by Mr. Hughes are as follow:—*President:* Mr. Glaisher.—*Vice-President:* Mr. J. R. Johnson.—*Treasurer:* Mr. T. S. Davis. The five gentlemen proposed as members of the Council were Messrs. Elwell, Goslett, Howard, Spencer, and Woodbury.

Mr. Stillman proposed a second list, differing only from the former in respect of the name of Mr. Dallmeyer being substituted for that of Mr. Glaisher as President, and the name of Colonel Wortley for that of Mr. Goslett.

A third list was proposed by Colonel Wortley, viz., Mr. Glaisher, President; Dr. Mann, Vice-President; and Drs. Farre and Diamond and Messrs. Stillman, Hughes, and Swan as members of the Council.

It was determined that the lists should be printed, and that the election should at the next meeting be conducted by striking out the names of all but those selected.

Mr. Hart proposed that no proxies be allowed.

Mr. Hughes gave notice that at the next meeting he would propose that a committee be appointed to revise the laws of the Society.

Dr. Mann then read a paper on the recent eruption of Mount Vesuvius, illustrated by a fine collection of photographs.

Colonel Wortley had found it necessary, when photographing in the sulphur vapours of Vesuvius, to protect the sensitive plate by cementing a plate of glass over it so as to hermetically seal it.

Mr. Stillman alluded to analogous methods adopted by Mr. Macpherson, of Rome, under similar circumstances.

Thanks were awarded to Dr. Mann, and also to Surgeon-Major Black, by whom the photographs had been taken.

After the reading of some *Notes on Sepia-Toned Prints*, by Mr. W. H. Watson, the meeting was adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held on the 8th instant—Mr. G. W. Simpson, Vice-President, in the chair.

Mr. A. C. Burgess having been admitted as a member, a number of enamelled photographs were exhibited by Mr. B. J. Edwards. These consisted of paper pictures glazed with gelatine and collodion; and, in reply to a question, Mr. Edwards said that he did not exhibit them as novelties for they had been prepared by a process well known for many years.

The discussion on Mr. Croughton's paper upon *Enlargements* versus *Direct Portraits*, which had been read at the previous meeting, was then entered upon, the discussion being opened by Mr. B. J. Edwards reading a paper *On the Best Way to Make Enlargements*. [See page 27.]

In reply to a question by Mr. Wilkinson, concerning the best process for producing enlargements where retouching was had recourse to, and of preventing retouching from being seen,

Mr. Edwards said he used a soft crayon stump to soften the retouching, so as to prevent it from being visible in the finished enlargement.

Mr. Croughton observed that people aimed at getting a false texture on the negative, which was highly objectionable.

Mr. Edwards advocated the use of a large lens for working with when retouching a negative. It should be so large as to permit both eyes being used without being near the edge of the lens.

Mr. Foxlee said that in the production of negatives for enlargement sufficient attention was not paid to the importance of having them as free as possible from granularity. The coarser the atoms were of which the negative was composed the less perfect would be the enlargement.

Mr. Edwards thought this might be obviated. By putting the negative a little out of focus all disadvantage arising from texture would be got rid of.

Mr. Foxlee: Yes! But this would be at the expense of sharpness of the image.

Mr. Edwards found that albumen gave an image of such a character as to produce exquisite fineness. A slight loss of sharpness he considered advantageous rather than otherwise.

Mr. Foxlee thought Mr. Croughton's method of using a transparency of a size intermediate between that of the original negative and the enlarged negative was wrong. It should either be made the full size at once, or the enlargement should be produced from a transparency the size of the small negative.

Mr. Brooks narrated a curious incident he once met with in enlarging. He took of a restless horse a negative, which would not enlarge up to anything like the sharpness the owner desired. But, by taking a greatly reduced *cliché* from the negative and enlarging it, every hair was distinctly visible, although hairs could not be seen in the enlargement obtained direct.

A Member observed that if the hairs were not defined in the original it appeared to be a case of some sort of "spirit photography," or photographing the invisible.

Mr. Croughton said that he did not enter the field of discussion on fair terms, for he gave his process fully to the public, whereas Mr. Edwards kept his a secret. Let both be equally thrown open to the photographic public. In the pictures that he had shown there was very little retouching. With Edwards's process negatives, if not taken on flat glass, were liable to break from being pressed into such close contact with the albumen plate during printing. In his own practice he did not confine himself to any one process of enlarging, although in the majority of cases he used the process he had described. For many purposes he found a transparency obtained upon carbon tissue preferable to one by collodion, because with a hard negative he could obtain better detail than by using either albumen or collodion. He exhibited a somewhat hard transparency which he said had been taken by Mr. Edwards's process.

Mr. Edwards, examining the negative, denied that it had been so taken.

Mr. Croughton said that he had obtained it from a pupil of Mr. Edwards's, who alleged that it was done by the process stated.

Mr. Edwards denied emphatically that such was the case. In course of printing many hundreds of transparencies by his process neither he nor his assistants had ever broken a single negative, and they had never failed in obtaining perfect contact when printing upon an albumen plate, the preparation of which, moreover, was an exceedingly simple and rapid process. Referring to the autotype method of producing enlargements, *that*, he said, was a secret process quite as much, if not more so, than his, inasmuch as it had never been described, and the proper or special carbon tissue for that purpose could not be purchased.

Mr. Croughton said that he had often bought that tissue, and considered there was no secret at all in the method of using it.

Mr. Foxlee, on being appealed to by the Chairman, said that a special tissue was certainly employed by Messrs. Spencer, Sawyer, Bird and Co. for their transparencies used for enlargements; but whether that particular kind of tissue were an article of commerce he was not prepared to say.

Mr. Croughton again said that such tissue was in the market, as he had repeatedly purchased it.

Mr. Edwards observed that, with more experience, Mr. Croughton would change many of his opinions. Mr. Croughton had said that it was a much easier and quicker operation to put a negative and a piece of tissue in a printing-frame and print it out than to print for a very brief period upon an allumenised glass and apply a developer. They would be able to judge how far this was correct when he (Mr. Edwards) informed them that within thirty-five minutes he would by his process produce, ready for printing from, an enlarged negative, having in that time printed and developed the transparency, and from it produced the enlarged negative. In discussing a subject or criticising a process a person ought first to make himself thoroughly well acquainted with it.

Mr. Croughton denied having discussed Mr. Edwards's process, which he could not do, as it was a secret one.

After some further remarks,

Mr. Aldridge (*apropos* of the subject of large heads) said that it did not appear to be generally noticed that many of the direct heads for which Mr. Crawshay had offered prizes were in reality enlargements, not from a small negative, but from life. Concerning the dimensions to which competitors had been limited, every artist knew that the standard proportion of the face was a tenth of the whole human figure; and hence, if the eight inches in Mr. Crawshay's conditions were adhered to, the figure belonging to such a head would be not merely life size but beyond it, being really six feet eight inches. He had taken several pictures with a view to compete, his idea being that the large heads were to be taken the size of life. He began by measuring the head, and the first one measured was only seven inches. He had found considerable difficulty in adjusting the camera and lens to the sitter so as to obtain an eight-inch face, quite apart from the distortion thus necessarily produced. If large heads were to be perfectly taken the size must be reduced. The heads painted by Sir Joshua Reynolds were only seven inches in size—the female heads, at anyrate.

Mr. Foxlee: Even in taking a direct head life-size there must be a considerable amount of distortion.

Mr. Aldridge: Then how much more so when it is larger than life-size! I had to bring my lens—one constructed for the purpose—within four feet of the face of the sitter.

After some further discussion, a vote of thanks was awarded to Mr. Edwards for opening the proceedings, and the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held at the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 7th inst.,—the President, Mr. R. G. Muir, in the chair.

The minutes of the previous meeting were read and approved of, and the following gentlemen were admitted ordinary members:—Messrs. John Smith, John Aitchison, John White, A. D. Cairns, James Macdonald Hay, William Hislop, Albert J. Allan, Robert Younger, John L. Coulston, Thomas Carmichael, Thomas Dryburgh, Wm. Raeburn, Wm. Paxton, James Taylor, James Storrie, W. Rhind, W. Gilmour, G. F. Roger, W. Ingles, Councillor Donald, and Alexander Hunter, M.D., F.R.C.S.E.

A letter was read from Messrs. Poulton and Son, intimating a presentation to the Society's album of a large number of very fine photographs, including a series of beautiful cloud pieces. The pictures were handed round for the inspection of the members, and were very much admired.

The President said it was not often that the members had an opportunity of examining such a large number of prints so uniformly fine in quality. They would make their album an ornament to any society, and he had no doubt the members would agree with him in requesting the Secretary to convey to Messrs. Poulton and Son their best thanks for such a valuable donation.

Dr. Nicol then read a paper on *The Progressive Results of the Past Session*. [See page 28.]

Mr. Tunny said he rose to propose a cordial vote of thanks to Dr. Nicol for his admirable paper—admirable, he must say, with the exception of the concluding paragraph; but to it he must take exception. He thought that, as a Society, they had nothing to do with the opinion of sects as to how the Sabbath was kept, and such statements should find no part in the proceedings of the Society. He did not believe that there was a photographer in the country who had not done some photography on the Sabbath day, and he thought every man should be left to the freedom of his own will in such matters.

Dr. NICOL said that he had no wish to interfere in the slightest degree with the liberty of the subject; every man should be convinced in his own mind as to his duty. He thought that there was considerable difference between the private actions of a private individual, for which that individual was alone responsible, and the public scandal to which he had referred. He had written exactly as he thought; and, although he should be sorry to *delete* the paragraph objected to by Mr. Tunny, he would, of course, do so, if it were desired by the meeting.

Mr. TUNNY said he did not wish to divide the meeting on the subject, but would be satisfied if his protest were recorded.

Mr. W. NEILSON (who had taken the chair, as the President had to leave) said that he considered the paragraph one of the best in the paper, and should on no account like to see it *deleted*. He heartily seconded Mr. Tunny's vote of thanks to Dr. Nicol for the admirable review of the work of the session.

The vote was carried by acclamation.

Dr. HUNTER then handed round a large collection of very fine photographs of Indian landscape and architectural scenery, and gave some most interesting information regarding the subjects and methods of manipulation. He stated that much attention had been given to dry plates, but that on the whole they had not found them suitable for the climate or kind of work; and he mentioned, also, the curious fact that they had invariably the best results in the higher elevations.

Dr. Hunter was cordially thanked for the exceedingly interesting exhibition, and the valuable information accompanying it.

Mr. TUNNY then re-introduced his observations and experiments on the action of barytic nitrate in the nitrate bath. He said that his attention had been called to Mr. J. T. Taylor's observations on the subject in his paper on the work of the South London Photographic Society, and Mr. Henderson's experiments, as reported in THE BRITISH JOURNAL OF PHOTOGRAPHY; and on trying to repeat those experiments he was surprised to find that, so far as he could see, the barytic salt did not possess the properties there attributed to it. He had placed a little of an old bath in a test tube, and, by the addition of a few drops of distilled water, thrown down a slight deposit of iodide of silver. A saturated solution of nitrate of barium was then added; but, instead of dissolving the deposit, it actually increased it, by still further reducing the strength of the bath solution. He had also practically put it to the test in the following way:—He had an old bath giving an abundant supply of pinholes, and this he divided in two parts. To one he added the solution of barytic salt as recommended by Mr. Henderson, and left the other in its normal state. On taking a negative from a plate sensitised in each bath he found the untouched solution gave a better result than the one to which the barytic salt had been added, as, while there was no dimunition in the quantity of pinholes, the plate from the baryticised bath was covered with a whitish film, similar to that occasionally produced when the collodion had been made with an unsuitable variety of pyroxyline.

Dr. NICOL said he had, at Mr. Tunny's request, examined the sample of barytic nitrate which had been used in his experiments, and found that it was all right. He, too, had tried to repeat Mr. Henderson's experiments and failed; and, from the little examination that he had been able to make, he was quite sure that the barytic salt did not possess the property claimed for it. His experiments certainly showed conclusively enough that it neither prevented the throwing out of the silver iodide nor dissolved it after it was deposited.

The CHAIRMAN said that the idea of adding nitrate of baryta to the bath did not originate with Mr. Henderson; he had seen it done years ago by Mr. Roger, of St. Andrews. Although he did not know anything as to its action on the iodide of silver, he thought it had in some way a beneficial effect on the bath. A few days ago he had an old bath which had been laid aside for many months, and on trial it was found to give a plate completely covered with pinholes. He then added the barytic solution, and on another trial they were found to have nearly all disappeared, although the negative, especially in the shadows, was covered with a whitish deposit.

Mr. Tunny was thanked for his communication, and the meeting was then adjourned.

Correspondence.

M. ADAM-SALOMON'S MODE OF RETOUCHING NEGATIVES.—GROUND GLASS FOR NEGATIVES.—M. DE ST. FLORENT'S NEW PRESERVATIVES.—M. GILBERT'S DOUBLE-TRANSFER PROCESS.—PERMANENT SENSITIVE PIGMENTED PAPERS.

M. ADAM-SALOMON has just written a letter to M. Ernest Lacan, in which he rather condemns the practice of retouching negatives in pencil upon the film side, and recommends as a better plan to coat the back of the plate with a matt varnish, and retouch upon that. He says he frequently receives visits from photographers who show him negatives retouched upon the front, and he observes with regret that this, when done unintelligently, ruins the negative, whereas if done upon the back it could all be removed. He varnishes his negative in the ordinary way, and then simply repairs spots and blemishes upon the front; after which he applies a matt varnish to the back, and does all the important retouching upon that. The qualities of the negative are not, therefore, immediately compromised by the retouching.

I know nothing practically of these methods of sophistication, having never retouched a negative in my life beyond blackening a sky; but I would venture to suggest, as an improvement upon M. Salomon's matt varnish upon the back, to take the negative upon the polished side of a sheet of ground glass, and then to retouch in pencil upon the ground side, and to render other parts transparent by a touch of varnish, so as to give greater vigour to those parts in the print. All this could be easily removed afterwards if not liked, and the effect would, I should think, be softer than that produced by pencilling upon the front. Ground glass is a delightful surface to work upon in pencil.

Suppose a ground glass used for the negative, what would be the effect of collodionising and exciting both sides, and thus printing through two negatives, one upon the polished side and the other upon the ground side of the glass? The plate could easily be excited in the bath by putting it upon a bent dipper of silver wire; and it might be developed in a bath of iron solution and intensified afterwards. Some such plan as this may be that of M. Denier, of St. Petersburg.

Monsieur de St. Florent recommends two new preservatives for dry plates, viz., laudanum of Sydenham and extract of ratanhia.

The latter is made from the root of a plant which grows in the West Indies and Peru, and of which the botanical name is *krameria triandra*. It is used in medicine as an astringent, and contains a considerable proportion of tannin.

We are told that ten parts of the aqueous extract to 100 parts of water and ten parts of alcohol form an excellent preservative for dry plates. It gives much delicacy, and, perhaps, a little hardness to the negative, which must be avoided by using a collodion strongly bromised.

Laudanum, employed in the same proportions, gives even better results, and is to be preferred to acetate of morphia. The negatives are very harmonious, and present remarkable gradation of tone. The plates will keep good for several months. They can be developed by the alkaline method.

We ought to feel greatly obliged to every experimentalist who will fairly try new organic matters for a preservative and report results; but, at the same time, we must not ourselves be running after every new thing that is suggested in this direction without good reason to back it. We should never forget that the best dry-plate negatives ever exhibited were those by Mr. Russell Manners Gordon, which he took on his trip with me in Brittany, and which were organified with albumen, and developed by the alkaline method, followed by silver intensifying. No one has more thoroughly and conscientiously "gone in" at dry plates than Mr. Gordon, and to the last he swore by albumen. One great merit of this preservative is that it can be readily obtained of absolute purity and uniform quality, without the possibility of adulteration. Another practical point upon which Mr. Gordon used to insist was the final wash of gallic acid, as tending to give good keeping qualities *after* exposure. The albumen was, of course, previously washed off. Let us strive to profit by such valuable experience as his.

M. Gobert, one of the leading amateur carbon printers in France, is much charmed with a process of double transfer by means of a metal plate, which is the same in principle as that of Mr. Johnson, used by the Autotype Company. In fact, M. Gobert has now become a champion of double transfer as possessing some important advantages. The specimen portrait given in the last edition of the *Autotype Manual* is a splendid example of this process.

The fatty varnish which M. Gobert employs for his zinc plates is made thus:—

Alcohol at 40°	100 cents. cubes.
Stearine	1 gramme.
Resin	2 grammes.

The water in which the image is developed should be very hot, almost boiling.

When the proof has been developed upon the zinc plate it is treated with alum in the usual way, and its final paper support is then pressed into contact with it. This paper may either be gelatinised or albumenised, coagulated with alcohol. It is then left to get perfectly dry upon the zinc.

When dry the picture leaves the plate spontaneously, without the aid of heat.

Latterly M. Gobert has introduced the following modification, which he regards as very important in contributing to the perfection of the details:—After coating the zinc plate with the fatty varnish just described he applies a thin film of collodion to the plate, made in the proportion of four grammes of pyroxyline to one litre of solvents. This thin film adds greatly to the facility of development, and to the separation of the picture from the plate.

M. Bayron, of Lyons, makes his collodio-bromide emulsion as a jelly, in which state it will keep indefinitely, and then liquefies it when required for use by the addition of ether and alcohol.

Some of M. Rousselon's plates, done by his process of heliography, have furnished 4,000 proofs without deterioration. He has offered to supply, for insertion in the *Bulletin* of the Photographic Society of France, a portrait of M. Davanne by this process.

M. Franck de Villecholle has tested the permanent bichromated gelatine papers of M. Despaquis and finds them good; but the manufacture requires to be improved in order to obtain more harmonious proofs. M. Gobert has also tried these papers, but he finds the development of the image very slow and difficult, requiring several renewals of boiling water; he, therefore, suspects that the gelatine has begun to be insoluble, even after only a few days' keeping. He recommends M. Despaquis to abandon this mode of preparing ready-sensitised paper for commerce, and merely to supply pigmented tissue.

M. Pector has also tried the papers, and with similar ill success. The Autotype Company have, I believe, succeeded in preparing sensitive pigmented papers which will keep well for a week or two.

M. Despaquis observed that his papers keep well in a damp cellar even for five months.

MM. Geymet, Gobert, and Rousselon all agree in thinking that sensitive pigmented paper would not keep longer than three or four days in summer, or a week at other seasons.

Redon, January 10, 1874. THOMAS SUTTON, B.A.

THE LATE MEETING OF THE LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

"Ye lyon and ye unicorne
Were fyghtynge for ye crowne,
Ye lyon beat ye unicorne,
And drove him round ye towne."

GENTLEMEN,—The above flashed into my brain when I entered the room in Conduit-street last night and found a regular "set to" between the President of the London Photographic Society and Mr. Stillman touching the accuracy of the minutes of the last meeting of the Society.

There was Mr. Stillman protesting energetically that the minutes were *not* accurate; at him, roaring like the veritable "British lion," the President, now and again reading a paragraph and demanding, in a voice of thunder, "Is that inaccurate, sir?"—the unicorn (I beg pardon —Mr. Stillman, I mean) poking him up with "I maintain, sir, that the minutes are inaccurate because of the omission," &c., &c., &c. Then crash came down the presidential hand on the presidential desk, suggesting the direful consequences of what might have happened if the objector's head had been in the way. More thunder! Then another poke by the handing in of that "*merely* commercial publication" THE BRITISH JOURNAL OF PHOTOGRAPHY. Why, gentlemen, the superb contempt with which it was cast aside would have done credit to the celebrated Potts, of the *Eatanswill Gazette* (*vide* "Pickwick"). With what stentorian tones was your poor Journal stigmatised as "*merely* commercial!"

So the battle raged, until at last, with awful trembling, for I was fearfully afraid, I ventured mildly to suggest that the minutes were really not accurate, inasmuch as an important question had been asked of the Chairman at the last meeting which had not been answered, and no record of it appeared. This letter, gentlemen, will prove to you that I still survive; in fact, great Jove relaxed—not only answered the question himself, but administered something like a "jobation" to the parties concerned for not answering it before. *Up* jumped the Secretary, *down* came the presidential fist (not on the secretarial head, thank goodness! but within an inch of his nose) with a *fortissimo* "I WON'T HEAR YOU, SIR," and down dropped Mr. Secretary as if he had been shot.

However, a proposition was made that threw "oil on the troubled waters;" a note was added to the minutes, and after the storm came a calm that not even the apparitions of three lists of nominees for the Council in opposition to the Council's own list could disturb.

Now, gentlemen, I think Mr. Glaisher is, on the whole, a very fit person for President. He is able, willing, and conscientious, and a scientific man of great repute. He is also a man of power—small doubt of that! But even "mere" members may object to be "sat upon;" and, although many are timid, and prefer to rest quietly whilst the presidential volleys hurtle through the air just above their heads, yet all members are not equally complaisant; and I would suggest that for the future differences of opinion should be discussed with calmness and good temper, and that the most studious fairness on all sides (but especially on the part of the President) be shown to those who have a perfect right to express their opinions on matters relating to the conduct of the affairs of the London Photographic Society.—I am, yours, &c.,

Ealing Dean, W., January 14, 1874. R. J. SAWYER.

NOMINATION FOR MEMBERS OF COUNCIL.

To the EDITORS.

GENTLEMEN,—Please let me explain that Colonel Stuart Wortley has placed my name on his list of nominations for vacant seats at the Council of the London Photographic Society entirely without my knowledge, will, or consent. As a member he had an undoubted right to do so, and I am sure he excercised his right in kindness; but as I have been instrumental in preventing my name appearing on the other two lists he must please allow me to protest. Under present circumstance I consider it would be highly improper for me to permit my name to be so used.—I am, yours, &c., JABEZ HUGHES.

49, *Camden-square, London, January* 14, 1874.

To the EDITORS.

GENTLEMEN,—Will you permit me to inform those of your readers who will have to vote at the annual meeting of the Photographic Society that it is quite impossible for me to fulfil the duties of member of the Council if elected, and I must request the erasion of my name from the list.—I am, yours, &c., W. J. STILLMAN.

AID TO PACKING PLATES.

To the EDITORS.

GENTLEMEN,—I enclose two or three little contrivances which I find very useful in packing dry plates. The idea was taken from one of your correspondents, who advised similar corner-pieces of gutta-percha. I find, however, these are much easier to make, and stick on the corners of the plates very well:—

Take a small square of American cloth, cut out one of the triangles formed by its diagonals, and double over and glue. It is better to make them much larger than necessary, and then cut them to the required size.—I am, yours, &c., W. C. CROFTS.

GRADUATED BACKGROUNDS.

To the EDITORS.

GENTLEMEN,—Absence from England has prevented me from answering Mr. Henderson's letter.

I beg to forward his letters to me and copies of mine in answer, by which you will see that no understanding was ever arrived at. More than once I said and wrote to him—"Only on one condition will I give you my instructions, viz., that you sign my agreement without reservation or addition." I forward a memorandum dated November 24, 1872, and two agreements dated November 28 and December 5. You will observe there is not a word about putting the pen through the £100 clause. The agreement of December 5 has a clause inserted, without my knowledge, in Mr. Henderson's handwriting to this effect:—"And further that the said A. L. Henderson does not bind himself to the latter part of this agreement, as far as the hundred pounds is concerned, provided previous publication or want of novelty can be proved." At this first intimation of Mr. Henderson's wish, I resolved to have nothing more to say to him on the subject. I should have written to him to this effect, but it was then uncertain whether I should go on with this affair or not.

For a considerable time I was prevented from attending to business matters, and, without my knowledge, a printed notice was sent to Mr. Henderson, dated February 1st, informing him that I was ready to issue my instructions on receiving my fee. This led to a visit and an angry correspondence, which ended on Mr. Henderson's part by a silly threat to take legal proceedings against me.

Mr. Henderson speaks of a letter in which I insulted him and other photographers. This refers to a very energetic denial on my part of the truth of certain assertions of Mr. Henderson, in which he used the names of two gentlemen. Nothing would please me better than to have "this letter passed on to the interested to deal with as they think proper." At the time Mr. Tunny called on me and induced me to allow him to put his pen through the £100 clause, he was a visitor at the house of his old and intimate friend, Mr. Henderson (I have Mr. Henderson's word for this assertion), and it is not a little strange that both Mr. Tunny and Mr. Henderson should have had the same wish, viz., to get rid of the penalty clause; but of what took place at my house Mr. Henderson can know nothing, as he was not present.

I regret very much I have to write to you again on this subject, but I could not allow Mr. Henderson's attack on me to remain unnoticed.—I am, yours, &c., ROBERT FAULKNER.

Kensington Gardens-square, January 12, 1874.

CARBON TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—It was stated at the last meeting of the South London Photographic Society that our firm did not supply the same tissue that we ourselves used for the production of transparencies, and as half a truth is calculated to mislead permit us to make a few remarks on that statement.

When we commenced making enlargements we employed a certain tissue that answered the purpose extremely well; *that* tissue we have always sold, its composition is fixed, and it answers all the purposes for which it is sold as described in the Autotype *Manual*. Nevertheless, not being believers in finality, we have made a long series of experiments to secure in carbon transparencies those characteristics which shall yield the highest excellence in the enlarged negative. For a time we thought a change in the composition of the tissue led to this end, and at that period declined to sell the tissue so varied; but further research convinced us that such was not the case, while it led on to a discovery that secured the exact qualities we desiderate in a transparency. The nature of this invention we decline to indicate; we reserve it for our own benefit in the way of trade, satisfied if we can supply to our customers the best work in the market.

So long ago as May 2nd we wrote in your columns:—"We are anxious that carbon printing should be practised as extensively as possible, and are desirous of affording every facility in our power to photographers who may wish to adopt what is undoubtedly 'the process of the future.' But the 'speciality' of enlargements in carbon from carbon transparencies not being a process likely to be carried out efficiently, except upon a considerable scale, hardly comes under the category of carbon printing, and we therefore confine instructions in the practice of it to the licencees under our patents, although we make no restriction as to the purchase of the materials, which are at the disposal of everybody for the purpose of experiment."

This paragraph is still literally true. We use for our own purposes precisely the same "special-transparency" tissue that we sell, but the particular knowledge that we possess in its application to autotype enlargements we do not communicate. If any misconception exist in the mind of anyone on the point (as the discussion at the South London Photographic Society appears to indicate) it can only be because their information is not derived from reliable sources. Verbally and by letter we make the case clear to our customers. If they require transparencies for window decoration or lantern slides we advise to buy the tissue; but if, on the contrary, they desire fine autotype enlargements, we recommend sending the negatives to Ealing Dean as the shortest route to that end.—We are, yours, &c., SPENCER, SAWYER, BIRD & Co.

January 14, 1874.

HOWARD'S TENT.

To the EDITORS.

GENTLEMEN,—The testimony that Mr. W. J. Gough has given to the value of my tent will, I hope, induce other gentlemen to try their hands in improving and perfecting the idea of utilising the camera tripod as a support.

It is astonishing with what facility a yard or two of india-rubber cloth may be converted into a tent either for developing in or for changing dry plates. A few yards of cloth and a box of rubber solution are, I consider, now absolute necessaries amongst the amateur landscape photographer's chattels.

Messrs. Lee will, doubtless, be able to supply any of your readers with the article ready made, though many little improvements are constantly to be discovered when practically testing the tent, and such as only a photographer would discover.

In support of Mr. Gough's statement that he can work a whole plate size, I beg to state that I have always used a bath of that capacity in the tent, also a camera back 8 × 6, though only using plates 7 × 4, and that I should have no difficulty in working the larger size were I be so disposed.

The original tent has continued to serve me most efficiently, and has enabled me to work in many places, and under many conditions that would have been impossible under other circumstances.—I am, yours, &c., FRANK HOWARD.

January 14, 1874.

ANSWERS TO CORRESPONDENTS.

Correspondents should never write on both sides of the paper.

J. G. T.—A private reply will be sent.

J. A. L.—The effect can be obtained by using a perfectly black background.

AMATEUR (Kerry).—We know of the very thing you want. Send your address.

REV. B.—The pseudoscope is an instrument for effecting the "conversion of relief."

W. H. WATSON.—Thanks; but we do not think that an extension of our meteorological table would be attended with any benefit.

SYLVATICUS.—You have evidently had a capital collection of pictures, and the exhibition ought to have been popular; but there is no accounting for public taste.

TRADE CATALOGUE.—Messrs. Payne and Chapman, 63, Piccadilly, Manchester, have sent us their new catalogue, which is copiously illustrated, well got up, and contains all the requisite for photographers.

F. B. (Stafford).—According to Cooley, the formula of chrome-album made with potash is—

$$Cr_2\,O_3\,3\,SO_3 + KO,SO_3 + 24\,Aq.$$

HECTOR.—Use up your old collodion in the cleaning of plates. The recovery of the ether and alcohol by distillation is at best a dangerous operation, and should not be attempted by one so inexperienced as you apparently are.

H. N. WALDEGRAVE.—The tone of the prints is good, but the vignetting has not been successfully accomplished. The negatives are capable of producing very effective little pictures, but the vignetting must be more carefully managed.

CAER GWENT.—As the pictures were handed to the gentleman in our presence we know that no miscarriage took place. It is probable the neglect is owing to an oversight; we shall, therefore, send the letter to the person concerned instead of publishing it.

GEO. S. HASTIE.—A good way to clean your old collodion bottles is to put a little wood naphtha in them. By shaking well up the dry crusts of collodion will speedily be dissolved. The same naphtha may be used for the twelve bottles, transferring it from one to the other, and finishing off with fresh liquid.

M. NOTON.—Thanks for the calcio-magnesium cylinders. They were somewhat fractured during their passage by post; but quite enough remains to enable us to give them a trial, which we will do on the earliest possible occasion. The idea of applying the flame to the *end* of the cylinder is, we think, an excellent one.

I. M.—The paraffine lamp with two wicks will give a better light than gas but a still better light will be obtained from an argand paraffine lamp. This gives a very intense and pure flame if the burner be a good one. A plano-convex lens, such as that described by you, will not answer well as a lantern-condenser; but, if you resolve upon trying it, let the flat side be mounted next to the flame.

FERROT.—1. The spots on the prints are due to the old, and now well-known cause, viz., bronze powder from the back of the cards. Photographers have been cautioned against such cards times without number.—2. Not knowing the composition of the dye used in tinting the albumenised paper, we do not know how that would affect the permanence of the print; but we have not heard of the fading of any print that could be traced to the paper having been tinted.

JOHN JONES.—1. If your object be to lecture and exhibit views in public, write to any of those who supply lanterns and pictures for a catalogue, and from it select what you want. For small entertainments, such as are given to Sunday scholars and the like, Woodbury's scioptican is very useful.—2. For instructions in the "best mode of obtaining negatives of scenery," we must refer you to our ALMANAC for 1873, if you can obtain a copy, or to any *good* manual of photography.

G. H. B.—1. The only door required is an aperture of sufficient dimensions to admit the plate, with a flap to fall over it so as to exclude the light. These you will be able to devise easily.—2. The extension wires may be of about the thickness of the barrel of a quill.—3. While it is always desirable that the interior of a tent should be very dark, it is possible that yours will answer well enough provided the window admit no more light than is absolutely required.—4. The lens A is said to give a slightly sharper image than B when both are used with diaphragms of similar size, but we cannot speak from experience.

MORTON DAY.—The difficulty you experienced is indeed a singular one. Two facts must be realised—first, that the portions of bichromated gelatine thoroughly acted upon by light will have an affinity for greasy ink; secondly, that unaltered gelatine—that is, the portions not acted upon by the luminous rays—will absorb water, in which condition the ink will not adhere. How, in the face of these facts, you come to get a *negative* image from a negative we are at a loss to determine. Send us a detailed account of your proceedings, stating how long you allow the printing colloid surface to remain wet before wiping off and applying the ink. It would almost appear as if you had not wetted the surface at all previous to the first application of the ink.

IN TYPE.—We have been compelled, by pressure on our space, to hold over till next week articles by Mr. W. E. Batho, "D. W.," Dr. A. Sanders, and others.

METEOROLOGICAL REPORT,

For the Week ending January 14, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain fall.
8	29·93	SE	36	39	46	34	—
9	29·78	SW	45	46	50	38	0·02
10	30·06	SW	45	47	53	45	—
12	29·89	SW	44	45	50	35	0·02
13	30·15	W	34	36	49	34	—
14	29·96	W	47	49	—	34	—

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 716. Vol. XXI.—JANUARY 23, 1874.

REFORM IN THE LONDON PHOTOGRAPHIC SOCIETY.

A general statement of the movement among the members of the above Society in favour of reform, and also of the obstructiveness of the ruling section of the Council, was given in our last. We now furnish increased information and copies of the documents which have been alluded to. The first is of the original requisition, which was drawn up by some members of the Council, and received the necessary twenty signatures:—

"*December* 23, 1873.

"*To the President and Council of the Photographic Society of London.*

"We the undersigned members of the Photographic Society of London, convinced that its interests and usefulness would be materially increased by such modification of the laws by which its elections are regulated as will give its members at large a more direct influence in its affairs, do hereby join in a requisition to the Council to call a meeting, under the provisions of article vi. of the laws, to consider how best the laws and practice of the Society may be directed to that end."

Originally there was attached to this document a brief sketch of the changes desired; but it was thought that it would be better to take the sense of the meeting on the subject after the matter had been discussed than to formally state any definite programme. To prevent the discussion taking too wide a range a memorandum was appended to the requisition, limiting the business of the special meeting to an alteration of laws v. and vii., which express the mode of electing and the tenure of the officers of the Society. Also, supposing that a different method of electing the officers should be determined on a provision was made for nominating the officers, though not necessarily changing the individuals, for the ensuing year.

This, then, was the original requisition; and, considering that during the whole period of the Society's existence no such proceeding had ever occurred before, the Council were bound to pay special attention to it. The sixth law of the Society, which says that when twenty members sign a requisition "the Council shall be required to call a special general meeting within a month of such date," makes no limitation whatever. The members are not even required to state the purpose of the meeting; the duty of the Council is simply to obey the law and to call the meeting. As no twenty members would, however, call for a special meeting without stating its purpose, the requisitionists did name generally in their preamble, and more specially in the memorandum, the purpose of the meeting, although legally they could call for the meeting without such explanation. When the requisition was in the course of signature one signer said to another, who had been chiefly instrumental in drawing up the document, that it would be better to take legal advice before sending it in; "for," said he, "if there be a loophole or legal evasion possible, I am sure certain members of the Council will take advantage of it, and not call the meeting." "Oh! I think not," said the other; "though they may not think as we do, yet they will not treat this requisition in a mean and pettifogging spirit; they will meet us openly in discussion. Remember they are our fellow-members; and, besides, I believe them to be gentlemen and men of honour, and above descending to any unworthy means of evading a duty that may not be pleasant."

The document was, therefore, sent in under the impression that it would be liberally interpreted; but the reception it has met proves that even more obstructiveness exists than was anticipated. When the requisition was received in Council it was at once declared to be informal; it desired alterations in the laws and had not stated them specifically in words, &c., &c., and, therefore, a special meeting could not be called.

Now the Council here committed the twofold error of mistaking their own function and of not understanding the terms of the requisition. The Council seemed to have supposed that a special meeting could not be called unless they approved of it. If there be one thing clear in these laws—and there are not many that are so—it is that when twenty members sign a requisition a meeting must be called. It is not to the purpose whether the Council approve of it or not; it is their duty, as executive officers of the Society, to call the meeting. The Council have power at any time to call a special meeting; and the only meaning of this law is to permit twenty members to exercise this privilege when the Council may not see it desirable. But if the Council have power to override this right of the members then this law is a "complete farce," as Colonel Stuart Wortley properly described another of the laws. The requisition states that the signers are convinced that the interests and usefulness of the Society will be materially advanced by such modifications of its laws affecting its elections as will give the members at large a more direct influence in its affairs, and that they, in accordance with law vi., request the Council to call a special meeting to "consider" how the laws and practice of the Society may be best directed to that end. Here is the purpose of the meeting clearly stated, and the document being properly signed the Council were in duty bound to call the meeting. But they may say there was a memorandum attached which stated that the business of the meeting was also to be the alterations of laws v. and vii.; and, as the exact alterations were not stated, they could not call the meeting. The answer to this is that they were bound to call the meeting all the same; and if they could show that no alterations of the laws could take place, at least the meeting could "consider" the general subject.

As consideration should always precede alteration the most important object of the requisionists would be gained in knowing whether the feeling of the members was in favour of certain changes. The Council, however, did not look at the subject in this reasonable light; and though they would not call the meeting, as they were in duty bound, neither would they courageously avow that they would not do so, but they adopted an alternative which practically had no bearing at all. They proposed, without assenting to or dissenting from their duty—which was to call a special meeting—to receive a deputation from the requisionists to listen to what alterations they desired, with the view, possibly, to some combined action. This proposal is contained in the following letter:—

"*Woolwich, January* 6, 1874.

"Dear Sir,—I am directed to forward you, as being the first whose name is appended to the requisition signed by twenty members, a copy of the resolution which was carried *unanimously* at a meeting of the Council held yesterday to receive the requisition in question, viz:—

'That the Council will be happy to receive a deputation of the requisitionists to know the nature of the alterations they desire to bring about, with the view of endeavouring to co-operate with them in any reform of the Society's laws.'

"I have further to state that the Council will meet on Monday next, at 4.30 p.m., at Conduit-street, to receive such deputation.—Faithfully yours, (Signed) "H. BADEN PRITCHARD, *Hon. Sec.*."

The proposition in this letter seems very fair, excepting that the primary object of the signers of the requisition is ignored—the calling of the meeting. Had this been assented to, and the proposal of the Council been made in addition, it would have been reasonable; or, had the Council declined, for reasons given, but have made the proposition, that course would also have been straightforward. But as neither course was adopted, and, as the requisitionists object on principle to any *private* conferences on public matters, and believe the Society has already suffered too much by such proceedings, they declined the conference. They felt that no good would result from it, for by experience they knew that there was no section of the members so opposed to their views as the ruling party in the Council. Besides, the members of the Council, as such, have no more power to alter the laws than any other members of the Society; the subject can only be settled in general meeting.

At a meeting, then, of the requisitionists this reply of the Council was received, as well as a verbal report from some of the member, of the Council who had signed, as to how the whole matter was treated. After a long conference they authorised Mr. Whiting to return the following answer, accompanied by a second requisition signed by thirty members, in which, to prevent any further quibbling, they expressed how they would prefer the officers of the Society to be elected, and the conditions under which they should hold office. They feel, however, that an injustice is done in being thus forced to express themselves, as, in proposing such important alterations, they ought to be able to give their reasons at the same time, and which at a meeting of the members they would be able to do:—

"*January* 10, 1874.

"*To the President and Council of the Photographic Society.*

"DEAR SIRS,—I beg to acknowledge, on behalf of the requisitionists for a reform of the laws of the Photographic Society of London, the receipt of your letter, and to state in reply that I am requested by them to express surprise at its nature, and to decline the offer of a deputation, as the request has been, not for a private conference, but for a special general meeting of the Society. Although the signatories have the very strongest feeling as to the validity of their request, yet, in order to lay before the Council more clearly the scope of their views in reference to the proposed alteration of laws, they instruct me to hand to you another requisition, more numerously signed, giving exact particulars of the alterations they will propose at the special general meeting, which they hereby again request you to convene.—I remain, yours respectfully, "MATTHEW WHITING."

Copy of the second requisition alluded to in the preceding letter:—

"*January* 7, 1874.

"*To the President and Council of the Photographic Society of London.*

"We, the undersigned members of the Photographic Society of London, entertaining the conviction that its usefulness and prosperity will be materially enhanced by a modification of certain of its laws so as to give a more direct influence in its affairs to the members at large, do hereby place in the hands of the Council a requisition to call a special meeting under the terms of the law vi., in order that the laws v. and vii. may be repealed, and the following laws in lieu thereof be submitted to such meeting for approval:—

"*New law to be substituted for old law* v.

"'The business of the Society shall be conducted by the Presidents three Vice-Presidents, and eighteen members of Council. At all meetings of the Council five shall be considered a quorum.

"'The President shall be elected to serve for three years, and shall not be eligible for re-election until after a lapse of one year.

"'The Vice-Presidents shall be elected to serve for three years; each year one of them shall retire from office (the rotation being by seniority), and shall not be eligible for re-election, or to serve as a member of the Council, but shall be immediately eligible for the office of President.

"'The members of the Council shall hold office for three years. One-third shall retire each year by seniority, and shall not be eligible for re-election as members of the Council until after the lapse of one year, but shall be eligible for the office of Vice-President or President without waiting such interval of time.

"'The Council shall hold its meetings to be determined by itself. Questions before the Council shall be settled by show of hands, unless a ballot is demanded. Any member personally interested in a question under the consideration of the Council shall retire during its discussion.

"'The Council shall prepare a report on the general condition of the Society for submission to each annual general meeting.'

"*New law to be substituted for old law* vii.

"'At the ordinary meeting of the Society, in the January of each year, the Secretary shall declare the names of the Vice-President and of the members of the Council who retire from office, and shall also state the fact when the term of the President's holding office expires in that year, and shall invite the members present to nominate their successors—every name being proposed and seconded in open meeting. The list of nominations shall then be publicly read by the Secretary, and a copy of the same be sent to every member of the Society before the next following annual meeting.

"'The election for all vacant offices shall take place at the annual general meeting in February. If there be no more persons nominated than are required to serve those persons shall be held to be duly elected. If there be more than one nomination for the office of President, or more than there are vacancies for among the Vice-Presidents and members of the Council, an election shall be held for each vacancy, and the person who has the highest number of votes shall in each case be held to be duly elected.

"'If vacancies occur by death, resignation, or other cause, in the offices of Vice-President or members of the Council, individuals shall be elected at the annual general meeting to fill the vacant places, and shall serve the offices subject to the condition of retirement by seniority that would have applied to the persons whose seats they fill.

"'The Treasurer shall be annually elected by the Council from among its own members.

"'The Secretary shall be annually elected by the Council, and, if not already a member of the Council, shall be entitled to an *ex-officio* seat at the board, without a vote.'"

The following members signed one or both of the requisitions:—

T. J. Barnes.	George Lavis.
F. Beasley, Jun.	R. J. Mann, M.D., *Vice-President.*
Walter S. Bird.	W. H. Prestwich.
William Brooks.	C. B. Pretorius.
B. J. Edwards.	H. T. Reed.
Albert E. Fradelle.	J. R. Sawyer.
Alfred Goslett.	Sydney Smith.
George Hare.	J. A. Spencer.
F. W. Hart.	John Stuart.
Thomas Hawkins.	W. J. Stillman, M.A.
A. L. Henderson.	J. C. Tully.
Walter R. Holyoake.	W. Wainwright, Jun.
Fred. Holyer.	Francis H. Wenham.
Frank Howard.	G. C. Whitfield.
John Hubbard.	Matthew Whiting.
Jabez Hughes.	Frederick York.
J. R. Johnson.	

No other reply has been made to either of these requisitions, although one public meeting and two or three Council meetings have taken place since their receipt, neither is there any allusion to the subject in the last number of the Society's journal. The intention seems to be simply to set the members at defiance. The time has gone by for a meeting to be legally called on the first requisition, as seven clear days' notice must be given. The intention apparently is to treat the second requisition in the same way, as the Society's journal announces that the next meeting will be the annual general one, on February 10th.

Judging by the feeling evinced at the last meeting, and the just ground of complaint that so large a section of the members have, the next meeting will probably not pass off without the officers of the Society being taken to task as to why they have neither called the special meeting nor given a reason for their neglect of duty.

ENLARGEMENTS *VERSUS* ENLARGEMENTS.

A VERY animated discussion took place at the last meeting of the South London Photographic Society relative to the paper by Mr. Croughton, on *Enlargements*, read at the previous meeting. The discussion was started by Mr. B. J. Edwards reading another paper upon a similar subject. Three different methods were alluded to by the speakers who took part in the discussion, the whole of whom had good reasons to give for the opinions expressed by them. The three methods were—

1. Enlargement from a transparency obtained by direct printing from the negative—that is, on carbon tissue.
2. Enlargement from a transparency obtained by development.
3. Enlargement obtained from a transparency already enlarged to a certain extent.

These three very distinct methods had each its supporters, and we may fairly consider them on their own merits. We think it will be found that each plan has its particular advantages, so that it can hardly be said that any one of them is the *best* without qualification. It will be convenient to consider them in rotation.

The transparencies, then, from negatives taken by direct printing from the negative may be either upon collodio-chloride or upon carbon tissue. The former has been but little employed for this purpose, and is, perhaps, not well adapted for it, since the deposit in the collodion film, being obtained by precipitation, is not free from granulation when subjected to examination under a strong magnifier. With carbon tissue, supposing that the colour employed be perfectly homogeneous, the same objection does not hold good, and the result is a perfect translation of the negative—in the lightest as well as the deepest portions of the picture. Moreover, the thickness of the film in the latter case has some effect in ensuring a proper amount of depth in the darkest shadows. In the former case the sensitive compound is only of great tenuity; and if the contrasts in the negative to be copied require such deep printing that the deposit in the shadows has been acted upon by the light so as to change the whole of the sensitive chloride existing in that part of the film before the lightest portion of the picture has been sufficiently impressed, no greater amount of the light action will intensify these shadows, and from that moment the only action of a lengthened exposure is to *flatten* such portions of the picture and destroy the perfect harmony of the whole. In carbon tissue this is avoided, as it is always made sufficiently thick and intense to ensure there always being a certain portion of soluble gelatine remaining under the shadows, however long the printing of the negative may require.

With regard to the second method of obtaining the transparency the same objection holds good which exists in the case of the collodio-chloride, viz., that when the contrasts in the original are so marked as to necessitate so long an exposure that the whole of the sensitive compound in the film, whether it be in collodion or in albumen, is wholly acted upon before the lighter parts are sufficiently exposed, a certain flatness is sure to be the result. In the case of a delicate negative, expressly taken for the purpose of enlargement, these observations do not apply, and in such cases a transparency obtained by development leaves nothing to be desired, while the rapidity of the operation has much to recommend it. We suspect, however, that professional enlargers cannot always select the negatives from which they are expected to obtain good results, and, therefore, it is well that there should be a choice of methods to obtain transparencies most suitable for their purposes.

The third mode of procedure was alluded to by one of the speakers, Mr. Croughton, who advocated the employment of a transparency of a size midway between the original negative and the proposed enlargement. With a very perfect original, when the enlargement has to be carried to a great extreme, it may be desirable to adopt this method, as being likely to yield a more harmonious picture than enlarging directly to the full extent; but, if the negative have any tendency to hardness, the same objection, to even a greater degree, will hold good as in the case of the developed positive on collodion or albumen.

It seems not to have been thought worth while to consider a fourth plan of enlargement, viz., by direct action of the light through the negative itself upon paper for development. We look upon that method as exploded altogether. Only one example appeared in the recent exhibition obtained in that way, and, when contrasted with the other enlargements near it, there could be but one opinion as to its manifest inferiority.

Another point that was discussed on the occasion we are noticing was as to the advisability of retouching on the original, or upon the enlarged negative. We have had the opportunity of examining many negatives which have been most carefully retouched with the pencil, and which have yielded the most beautiful results when printed upon silver direct; but, when enlarged, the marks of the pencil were rendered so apparent that they were really disfigurements to the enlarged pictures, and necessitated a very considerable amount of subsequent working up. Mr. Edwards appears to have suggested a means of softening such markings by taking the enlarged negatives slightly out of focus; but we think that, unless the enlargement were to a very small extent, the loss of sharpness thus caused would infallibly mar the beauty of any picture so produced.

SPECIFIC GRAVITY: HOW TO ASCERTAIN IT, AND ITS VALUE TO PHOTOGRAPHERS.

WHAT is specific gravity? A definition of the term cannot be given intelligibly in a word or two; but we shall attempt to compress it in the fewest possible words. Specific gravity is the relation of the weight of a given bulk of one body to that of the same bulk of another body. A *measured* quantity—say an ounce—of mercury weighs very differently from a measured ounce of alcohol. It is much heavier; its "specific gravity" is greater.

It is essential that, in order that specific gravity be made measurable, some one thing should be assumed as a standard of comparison. For solids and liquids the particular body adopted as a standard is water, and the particular quantity of water a thousand grains. A specific-gravity bottle is one that contains exactly a thousand grains* of water, at the ordinary temperature of the atmosphere—say at 60° Fahr. Every experimental photographer ought to possess a bottle of this kind. Those made and sold expressly for this purpose have a nicely-fitting stopper with either a hole drilled through the centre of the stopper or a groove cut into its side. Hence, when the bottle is quite filled with water and the stopper inserted the overplus will escape through the hole or the groove, and the bottle will be left exactly full, and neither more or less than full; the weight of the contents must then either be a thousand grains or the half or the fourth of that number. Five hundred grains, or a little over an ounce, is a very common capacity for specific gravity bottles, and a bottle containing this quantity is what we generally use in preference to any other.

Those who have not a properly-constructed bottle of this kind may make one for themselves. Select a bottle which will hold five hundred grains of water. This is ascertained by first placing the bottle—one holding a little over an ounce—in the scale, and balancing it carefully with shot, then adding the requisite number of grains, and pouring water into the bottle until the scales are in a state of equipoise. A sharp notch is made upon the outside of the bottle by means of a file at the level of the water. It is better to pierce a hole through the bottle at this level, so as to ensure all the superfluous liquid escaping. A sharp-edged file, kept wet with turpentine or paraffine oil, will enable any one to cut through the bottle in a minute or two. To lessen the chances of error, it is best that this should be done in the neck rather than the body of the bottle. A bottle made in this way will be quite accurate enough for every purpose for which a photographer will require to utilise it.

We come now to speak of the uses of a bottle such as we have described.

In a formula for making pyroxyline, which we extract from our ALMANAC of last year, we find that sulphuric acid (1·840) and nitric acid (1·400) are employed. We further see a reference to ether of the strength or specific gravity of ·750. The exact value of these figures will be seen from the following simple rule:—To ascertain

* Or the half of this quantity.

the specific gravity of a liquid fill the bottle—one which contains a thousand grains of water—with the liquid to be tested; weigh it very carefully (using, of course, a counterpoise for the bottle), and the number of grains the fluid weighs is the specific gravity. If a bottle holding only five hundred grains be employed, then the resulting weight must be multiplied by two. Sulphuric acid, as everyone knows, is far heavier than water, and it is the stronger in proportion as it differs from the weight of water. Hence the meaning of the figures 1·840, which follow the sulphuric acid in a previous part of this paragraph, is simply this—that, whereas if the bottle were filled with water it would weigh a thousand grains, it will, when filled with sulphuric acid of the strength required for the purposes of the formula, weigh nearly twice as much, or 1,840 grains. Nitric acid is not so heavy as sulphuric acid, hence when the bottle is filled with *it* the weight will be only 1,400 grains, which is its specific gravity, represented by the figures 1·400. If the bottle were filled with mercury instead of sulphuric or nitric acid it would weigh far more, viz., 13·590 grains, which is *its* specific gravity.

Alcohol and ether are much lighter than water, hence the bottle when filled with either of these substances will not weigh so much as a thousand grains. By that strength of ether represented by ·750 sp. gr. is merely meant that when the specific gravity bottle is filled and weighed it is now so much lighter than when filled with water as to fall short of it by two hundred and fifty grains, the weight being only seven hundred and fifty grains, which number represents the specific gravity of the ether. The lighter the ether and the alcohol the stronger they are of course, the contrary being the case with the acids named; for the addition of water to them merely brings them closer to the specific gravity of water. Anything heavier than water has a point placed after the number of thousand grains it weighs; with anything lighter the point is placed before the number of hundreds of grains.

We do not feel it necessary here to go at any length into the subject of specific gravity as applied to gaseous or solid bodies; but, as the latter may be of some use to photographers, we shall give the rule for ascertaining it:—Weigh the substance first in water and then in air, and divide the total weight (that in air) by the loss of weight in water; the quotient is the specific gravity.

HEADS AND FACES.

Apropos of enlargements, which seem at present to be the question of the hour, a member called the attention of the members of the South London Photographic Society, at the recent meeting, to the fact (?) that the standard of size adopted by Mr. Crawshay for pictures designed for competition for his prizes, viz., eight inches, was *too great*, stating that few heads would be found to be so large. He is reported to have said that "every artist" *knew* that the proportion of the head was *one-tenth* of the entire height of the figure, and that, consequently, an eight-inch head would represent a person six feet eight inches in height.

We are inclined to think that "every artist" will not endorse this statement, and we believe that if the member in question will call in at the British Museum, taking a tape or rule in his hand, and will apply it to ascertain the dimensions of the great majority of the statues he finds there, he will admit that he has made a mistake as to the universal knowledge of artists respecting the proportions of the classical examples which surround him on every side.

We have just measured three persons—males of the respective heights of five feet nine and three-quarter inches, five feet seven and a-half inches, and five feet six inches—and in all three cases the size of the head, measured as indicated below, was found to be exactly nine inches. As there is here great discrepancy of opinion upon a matter of fact, it may be well to inquire in what manner the measurement of a head should be taken. In measuring a recruit he is placed against an upright post, graduated in inches, and a horizontal sliding bar is brought down to the top of his head, so that its highest point is registered upon the scale; and no matter whether the head be shapely or not, whether the forehead be prominent or retiring, a horizontal line taken from its highest point determines the matter.

Having settled the top of the head, where are we to fix upon for the lower limit of it? Clearly we should imagine a similar plan must be followed, and a horizontal line drawn from under the chin, and touching it, must include between these two lines the whole of the "head." We are particular in insisting upon taking the measurement between horizontal lines, as we have known pictures in profile to have been measured almost diagonally from the top of the head to the point of the chin, which in such a case would give a very erroneous idea of the real size.

We believe that if the above mode of measurement be adopted it will be found that, in the great majority of cases, nine inches is the *usual* size of the head in men, and eight and a-half inches in that of women. It must be borne in mind that the head does not bear any distinct ratio to the extreme height of the figure, as there is seldom much difference in the size of the head either of tall or short persons. We think, therefore, that Mr. Crawshay's standard, so far from exceeding it, does not come up to the natural size; and in this we think he is correct, as a head really "life-size" in a photograph will always appear larger than it really is.

When we first recorded the fact that Colonel Stuart Wortley had, by the addition of nitrate of uranium to a collodio-bromide emulsion, brought to light certain very desirable qualities not previously known to be possessed by that emulsion, the announcement was not received with entire acquiescence. "Ground bones and sand," according to some, would prove of equal utility—a statement which the originator afterwards recalled. Our friend Dr. Nicol, too, was one of those who had no great faith in it, and gave utterance to his unbelief. He has, however, reconsidered his decision, and finds that an excess of silver with nitrate of uranium really does possess virtues the existence of which he had not previously recognised. In a letter from him he says:—"Notwithstanding all that I have said against the large excess of silver in emulsions I am becoming a convert to it. Some months ago I prepared a number of samples, including uranium, with large excess of silver, and have been making a set of plates every ten days, with a view to testing keeping qualities, &c., and, contrary to all my previous experience of uranium, it seems to turn out the best. More, much more, anon." Truth will eventually prevail.

DRY PLATES WITHOUT WASHING.

In accordance with my promise last week I will now proceed to give further details for working the emulsion process then described. I must own that on paper the manipulations seem rather troublesome, and the necessary waste of the first lot of solvents may be considered a defect; but in practice the labour will be found very slight, and the loss of material may be so reduced, by proper precautions, as to be unworthy of mention in view of the advantages which accrue.

In order to effect the latter purpose I find it useful to increase the proportions of bromide and pyroxyline in the first emulsion; that is to say, I make use of a very much thicker collodion than usual, the product of which, when sensitised, washed, and dried, may be redissolved in a larger quantity of solvents, so as to form an emulsion of the usual strength. The pecuniary loss arising from the waste of ether and alcohol may be further reduced by the use of the cheaper kinds. The ordinary methylated spirit I find quite good enough for the first operation, as a mottled or "crapy" film is a matter of no consequence. Care must be taken, however, not to use the spirit sold as "finish," but a sample guaranteed "free from gum."

The formula of my collodion is as follows:—

Pyroxyline	135 grains.
Anhydrous bromide of cadmium	180 „
Methylated ether	10 ounces.
„ spirit	5 „

Dissolve, and allow the sediment to subside in the usual way. When perfectly clear it may be sensitised by the addition of—

Nitrate of silver	300 grains.
Methylated spirit	5 ounces.
Water	*quant. suff.*

The crystals of nitrate of silver must be pulverised and heated with the spirit, one ounce at a time, in a large test tube, using a few drops of water before each addition of spirit to assist the solution, and added gradually to the collodion, shaking vigorously after each addition. When the whole of the silver has been added it will be seen that it is much in excess of the bromide. In this state I allow the emulsion to stand in a warm place for at least twenty-four hours, that the free silver may have its full action on the organic constituents of the collodion, and then add—

Anhydrous bromide of cadmium	70 grains.
Methylated spirit	1 ounce.
Water	*quant. suff.*

Dissolve by the aid of heat.

There will now be an excess of soluble bromide present. It will be noticed that I make very free use of water in dissolving the salts; but, as I have remarked previously, the character of the first emulsion as regards "structure" and flowing properties is quite immaterial, provided the solvents are not sufficiently diluted to precipitate the pyroxyline and bromide of silver. The above quantity, when washed and dried, will be sufficient to form thirty ounces of the complete emulsion, which will contain four and a-half grains of pyroxyline and a little over eleven grains of bromide of silver to each ounce. This quantity of pyroxyline I find quite sufficient, as subsequent additions in the shape of organifiers increase the viscous nature of the emulsion.

After the last addition of bromide of cadmium the mixture will keep for some weeks—probably for months; or may be poured out and washed within two or three hours, if preferred. It must first, however, be carefully filtered; then add—

Glycerine............................. 6 to 8 drachms.

Shake well, and after subsidence it may be poured on to a glass plate, and the solvents driven off by the aid of a water bath, or allowed to evaporate spontaneously. The glycerine is used to facilitate the removal of soluble matter during the subsequent washing. Its functions are in no way *chemical*, but it should on no account be omitted, as it plays a most important part *mechanically* in causing the water more thoroughly to permeate the body of the film. In pouring out the mixture some little care must be taken in order to secure as uniform a thickness as possible in the resulting layer of collodion, as upon that will depend to a great extent the length of time necessary for the thorough removal of soluble matter. Greater regularity of result will also be attained if a fixed rule be observed in the matter of thickness of film—not only as regards sensitiveness, but, by dividing the film into pieces of a fixed size while wet, the necessity of subsequent weighing will be obviated.

From eight to twelve square inches of surface to each ounce of the above emulsion I find to give a film sufficiently stout to bear handling without breaking up into smaller pieces, while, at the same time, it possesses a sufficient degree of permeability. The above quantity I spread upon a couple of 12 × 10 plates, which I prepare as follows:—After thoroughly cleaning one side I gum, along the edges of the other, strips of stout paper, which are turned up and gummed at the corners so as to form two dishes about an inch in depth. Into these the emulsion is poured in equal quantities, and must be left in a tolerably-level position until thoroughly "set." This will occupy about six hours at this time of the year, unless artificial heat be resorted to; but a much longer time may be allowed with advantage. I usually pour out the emulsion in the evening and leave it for twenty-four hours. I then pour into the dishes about a quarter of an inch depth of distilled or boiled rain water, and allow to soak for ten minutes, when it may be changed. This must be repeated until all signs of greasiness have disappeared; the second and subsequent changes may be any ordinary water.

By removing the last traces of ether and alcohol before detaching the film from the glass, the risk of partial solution in the washing water and consequent loss of material is prevented—a tough, leathery sheet, which will bear a good deal of handling, being the result. This state being attained, I divide the film into squares of one inch by ruling lines across the plate with a silver-bladed fruit knife or an ivory paper knife. A better plan is to use a piece of box or other hard wood bevelled at a rather acute angle, so as to form a knife edge; this, if pressed perpendicularly on the film without any sawing motion, will divide it in straight lines. Repeat the operation, making the cuts at right angles to the first series, and detach the small squares from the plate. Place the detached film in a jar or other vessel of suitable size, and cover with boiling water, which must be changed three or four times at intervals of about ten minutes, or until, by testing, it is found that all the free bromide is removed.

Cold water may be used if preferred, but the washing will then occupy a much longer time. When thoroughly washed, press carefully between folds of clean blotting-paper and dry. In doing this I use artificial heat, "baking" the compound until it shrivels up into a hard grey mass about one-tenth of the bulk of the moist film. If the latter have been divided into one-inch squares as directed, there will be no necessity to weigh the dried product, as we know that eight of those squares contain the solid constituents of one ounce of emulsion. In its dried state the "pyroxilo-bromide" of silver (if I may use the term) should keep indefinitely, and to form an emulsion it is only requisite to dissolve the proper quantity in equal parts of ether and alcohol, both of which must be as free from water as possible.

This emulsion I have not yet had an opportunity of testing as regards keeping qualities for more than a few weeks, but so far I have found no deterioration. Theoretically it should keep as well as in the dried state, as it is free from all soluble matter, the bromide being in an inert state, and subject to no chemical action as long as it is protected from light. It is remarkable that the bromide subsides much more rapidly than in an ordinary emulsion, but the deposit is so fine that it merely requires shaking to make it all right. So far we have an emulsion that may be used in the ordinary way, either wet or dry; but, by the addition of other substances, the necessity of any washing ceases.

The substance I employ is soap. So far I have only used the common yellow soap; but through the kindness of a friend I have now obtained a sample of pure white, of special manufacture, which I am about to try. I prepare the soap by scraping it into shavings, and drying in a pretty hot oven until it swells and becomes perfectly white. I then make a saturated solution in alcohol, or a mixture of alcohol and ether, and filter. Of this I use from fifteen drops to half-a-drachm or more to each ounce of emulsion. This gives plates of great sensitiveness, full of detail and quite free from fog. If greater vigour be necessary an addition of tannin may be made with advantage. I use a solution composed of—

Tannin	64 grains.
Absolute alcohol (meth.)	1 ounce.

Dissolve and filter. Of this I have used as much as half-a-drachm (or four grains of tannin) to the ounce of emulsion; but great care is necessary to avoid drying marks when that quantity is used. The best results have been obtained with—

Saturated soap solution	1 ounce.
Tannin	40 grains.

Dissolve and filter. To each ounce of emulsion add twenty minims.

I need say very little as to the preparation and development of the plates. For small plates no substratum is at all necessary; indeed, up to 7½ × 4¼ the plates scarcely require tipping at the edges. After coating, the plates may be dried by artificial heat, or may be put directly into the plate-box. Heat is, perhaps, preferable, as the "backing" can then be put on as soon as the plates are coated. By the use of Mr. Cooper's aurine even that nuisance may, no doubt, be obviated. All I have to say upon development, at present, is that it is imperative that that operation be commenced with a wash of diluted spirit, to neglect which means total failure.

W. B. Bolton.

"THE PENCIL OF NATURE."

[A communication to the Manchester Photographic Society.]

Our Secretary has announced that I purpose this evening to read a paper on the *Pencil of Nature*. I intend merely to call your attention to the present condition of some prints in Nos. I. and III. of that work, and to make some general remarks on the fading of photographs.

It has often occurred to me that one of the reasons why so few papers are read before our Society is that members hesitate to undertake the writing of a formal paper. It is much easier to come to the meetings prepared to speak on a certain subject than to sit down to the task of writing. A short address would in most cases answer the purpose of introducing a subject for discussion, and it is this which makes our meetings useful and interesting, and there is no trouble of, possibly, a tedious preparation. A little previous thought and a few examples for illustration are alone necessary. The announcement of a subject for discussion has a marked influence on the attendance of members, and I am glad to be able to say that for our next two meetings papers or addresses are promised.

We have all heard of the instability of ordinary photographs on paper; and if we did not know it from experience we are constantly reminded of the fact by writers in the various newspapers and periodicals. If those who write understood their subject, and refrained from making sweeping assertions, I, for one, would not complain. But I contend for the stability of photographs, and complain that imperfectly-informed writers do our art serious injustice. Take the following as an illustration. It is from the *Lithographer*, No. 42. The writer in an article on *The Correlation of Photo-*

graphy, Lithography, and Typography, says, respecting photographs:—

"There are few persons who have not suffered from the disappointment occasioned by the ephemeral character of the ordinary photograph. The portrait of a child, a sister, a parent, or a wife has been treasured, perhaps, for years, and its owner has had the pleasing impression that in the picture the loved but lost one lives again. The view of a noble landscape, seen perhaps under circumstances that can never recur, has remained in our favourite album, and the happy anticipation indulged in that in some quiet hour we may in fancy once more visit the scene. Alas! when brought to the light our pictures are gone! The lineaments of the cherished features, the lights and shade of the landscape, are all blurred and blotted out, and there is little before us but a confused series of shades of brown, pink, and yellow.

"We have by our side a copy of the *Photographic Art Journal*, published in 1858. One cannot help smiling at the seedy and sickly appearance of the good people who once adorned its pages, and the landscapes fading into that distance which assuredly does not, in their case, lend any kind of enchantment to the view. Dr. Trench, Dr. W. Russell, Miss Nightingale, and Samuel Lover are or *were* all there, whilst Windsor Castle and Stoke Pogis have got into a London fog. The editor well says in his preface that, as a graphic art, the strongest recommendation of photography is fidelity—a truthfulness impossible to the productions of the other graphic arts; but if he could have added durability to fidelity, he would have been able to write in a far different strain from what appears in his closely-printed pages.

"This non-permanency is the great defect of the photograph, and it almost outweighs all its other advantages, even the absolute accuracy to nature which it presents, and the ease and simplicity with which the picture has been obtained. What still further aggravates the matter is that this fleeting character is probably inherent in the ordinary photograph; for the very action of light which forms the image tends to destroy it, even as our life is gradually exhausted by the very means we adopt to preserve it."

Now it cannot be denied that some photographs do fade; so do water-colour drawings. Some oil paintings change colour (who does not remember the *Strawberry Girl?*), and even become almost valueless. But would the newspaper and periodical writers make the same charge of want of stability of water or oil colours because some have faded? I have generally noticed that ordinary photographs are called "ephemeral" when something is to be described which is supposed to be permanent, and that will be seen to be the case in the article from which the above question is taken.

I have here, perhaps, the best example of a faded photograph which you have ever seen. It is stamped on the back "Patent Talbotype, or Sun Picture," and in ink is written *The Boulevards, Paris*. Without these marks it would be very difficult to know what was once on the paper. This print was issued in the *Pencil of Nature*, in 1844. Fortunately I have here another print from the same negative, printed in the same year, and apparently in the same condition now as it was nearly thirty years ago. I have also here other examples from the same work—some faded and others perfect.

Can this want of stability in some cases and permanence in others be explained? I think the cause is obvious. The print of *The Boulevards*—now almost white paper—has evidently been fastened to the mounting-board with some substance which has injuriously affected the print. The other print of the same subject is not attached to the card, excepting for about a quarter of an inch around the edges, and this quarter of an inch of the photograph, you will notice, is as completely faded as the other example. Can further proof be wanting that the mounting material has caused the mischief? It would be valuable and interesting if the history of these two prints could be made known. Was gum or paste used? and why were some of the prints firmly attached to the card, while others were fastened at the edges only? I wish it to be noticed that my remarks refer to all the prints I now produce. The four fastened to the mounts are badly faded; all the rest are in good condition.

I am aware that this subject has often engaged the attention of photographers, and is surrounded by many difficulties. It is certainly very mysterious why some prints fade and others do not. I have just selected from our portfolio a print of *Haddon Hall*. It was printed on January 5, 1855, for a special purpose, and was submitted to the Council of this Society on the evening of the day named. The print was toned in the old hypo. and gold bath, and was merely rinsed in water and then mounted with gelatine. It is on plain paper. I wrote on the back of the print "Not washed," adding the date, and it has remained in the portfolio until this evening. I will endeavour to show you its present condition by means of the magnesium light, and you will see that it appears to be in the same condition as when first printed. There is a small yellow mark, but that was done when I last saw the print, about fifteen years since.

I have also selected from the portfolio two other prints done in 1855. One is the portrait of Mr. (now Sir William) Fairbairn, and a copy of an oil painting. These appear to be unchanged. I have to thank Mr. Lund for bringing two prints of the same subjects, and those seem to be unchanged also. It has to be borne in mind that all prints are not printed to the same depth. Some are lighter than others, and when placed beside the darker ones appear to be changed when they are not. Our President says his print of Sir W. Fairbairn faded. Perhaps it was not taken care of. I do not say that my prints are less liable to fade than others; but I do contend that if every care be taken in the preparation and mounting of photographs, and they are then as carefully preserved as water-colour drawings, we have nothing to complain of as to their permanency. As a rule, photographs are not taken care of, and in this is to be found one explanation of their fading.

It is often said that a photograph has faded when the paper only has changed colour. Here is an example in a group of three figures —a gentleman and two little boys. One of them, then about seven years old, is now a member of our Council—evidence of the age of the print. It will be seen that the half-tones in this print are good, but the paper appears somewhat yellow. It will be remembered that this yellowness of prints was frequently the effect of the old system of toning. Here are examples which the magnesium light will show you to be perfect in every respect, excepting the colour of the paper.

Much of the discredit under which photographers have fallen arises from cheapness and carelessness. Look through any friend's album, and the probability is that all the "seedy" prints have been done during some sea-side visit, or have emanated from some of those places of business noted for cheapness rather than quality. Not many months since I was examining a celebrated book of travels containing the portrait of the author of the book. This book had not been published three months, and yet the portrait was fading. The work was sold in thousands, and there can be no doubt, I think, that cheapness had something to do with the faded print.

A. Brothers, F.R.A.S.

ON THE GRADUAL DECLINE IN THE QUALITY OF PHOTOGRAPHIC PORTRAITS DURING THE LAST TWENTY YEARS.

Photographers have become accustomed at the close of every year to congratulate themselves on the continued progress of their art in its processes, appliances, and results; and there can be no doubt that wonderful progress *has* been made during the last few years in *some* of its branches—in positive printing, for instance, in all its novel ramifications and applications; but in portraiture, which is after all the most important branch in photography, what real progress has been made since the introduction of collodion in 1851? In what respect have we really *improved?* In what really valuable quality are photographic portraits better now than they were then? This is a question worth considering; for possibly we may find that, instead of advancing, we have been retrograding in this particular branch of the art, and, if so, it may be worth while to try and find out the cause of this decline.

I have just been looking over a series of portraits of my son, taken at different times between the years 1852 and 1874—all, with one exception, by professional photographers of the first rank; and the sad conclusion forced upon me is—that in those qualities which really constitute the value of a son's portrait to his sire the early ones are the best. The same thing is equally true of portraits of my wife and other members of my family. In fact, photographic portraits of the present day, so far as I can judge, are inferior to those of twenty years since.

The first time my son ever sat for his portrait was when he was quite a child. This was in Florence, in 1852; and he was taken along with his mother, seated upon her knee. The portrait was a daguerreotype by the Chevalier d'Iller; it is still in good preservation, and has not faded in the least. This daguerreotype of my wife and child, done two-and-twenty years ago, is a fine example of that process, and I value it as a portrait more than anything else in my possession, and next to the originals themselves. What a wonderful study is this truthful portrait of what they both were then! How perfect in all its details, not only in the lights but in the deepest shades! how exquisitely rounded and modelled! what marvellous gradations are there! How many hundreds of times have I had it before me, as I have again now, studying it, and always with increased pleasure! What other *souvenir* of my wife when a young mother, and my son when a child in her loving arms, could ever equal in value this perfect image of them as they were then, upon the silver plate? And what does it matter to *me* when I pry into every part of this wonderfully-perfect image, every detail in which is a pleasing memory awakened, whether the whites are like those of paper and the blacks like a smear of liquorice juice, or whether they are the whites and blacks of a polished metal plate? What does it signify to *me* whether the picture has a metallic shimmer or an albumen glaze, provided I can see it well and distinctly under my magnifier in some one position? And what *ideal* representation of those whom I love could equal it in value and interest for *me?* Then why should *I* desire to sacrifice that literal truth which constitutes the special merit of such a *souvenir* to any of the puerilities and pretty conventionalities of what is called art; that is to say, to impossible optical effects of light and shade, and to impossible freaks of anatomy and expression, which can exist only in an artist's brain—absurdities which always become evident to an educated eye, and which I despise the more as I grow older and love deception less?

The Chevalier d'Iller, at the time of which I speak, was the only professional photographic portraitist in Florence, and he used to charge twelve francs for his quarter-plate portraits, and take, perhaps, on an average three per day. This was a handsome income for a *vieux garçon*, and it is surprising that he had no rivals; but that may be accounted for by the fact that his work was surprisingly good. I have never seen portraits more beautifully modelled than his, or freer from technical defects; and as I remember perfectly the construction of his studio I will endeavour to describe it.

It was a large square room, with a flat plastered ceiling and two windows—one facing the west and looking down the Arno, the other facing the north, and each being near the centre of its respective wall. The room itself was one of the highest in an old palace near the foot of the Ponte Vecchio. These windows were about four feet wide, and were furnished with white blinds. The camera was placed between them in the north-west angle of the room, and therefore in darkness, so that the eyes of the sitter were never directed towards the light. In the morning the sitter was placed by the side of the west window, and the shaded side of his face was lighted up by the other window with its blind down. In the afternoon he was seated by the north window, and the shaded side lighted from the west window. The exposures were generally about six to ten seconds. The background was plain, and there were no accessories. I worked with this gentleman every day for a month, and he taught me his process. He rarely made a failure, and rarely took a second plate of his sitter. The whole operation from first to last occupied about half-an-hour, and the sitter took away his portrait with him, finished, in a *passe-partout*. Nothing in the world could be simpler, and the results were the most perfect that it is possible to conceive.

Sometimes we used to take a stroll together in the town with a view-camera and sensitive half-plates, which would keep good the whole day. These views along the Lung 'Arno or in the Boboli Gardens, on the Cascine or the Piazza, were marvels of perfection in their truthfulness of detail, equally in the shadows as in the light; whilst interiors of churches, galleries, and apartments came out equally well. And these daguerreotypes, we must remember, could be copied to any scale, and prints taken from them now in the printing-press; whilst the whole paraphernalia for exciting and developing the plates could be carried in a very small compass, and the operations be performed *en route*. Why, then, have so many of us wasted valuable years over dry collodion glass plates, which are fragile, heavy, coquettish, troublesome to prepare, and yield inferior results?

The next portrait of my son which I possess is a glass positive, taken when he was a boy at school, and which cost a shilling. It happens to be a very good one of its kind, and, like the daguerreotype, was taken in an ordinary room, by the side of a window; but it is inferior in all respects to the latter, and a proof that photographic portraiture had now made its first backward step.

The next is a half-faded print upon albumenised paper, taken in 1858, from a collodion negative of the ordinary kind and quality—untouched, and therefore suggestive of the truth to some extent. Putting this "thing" by the side of the daguerreotype is to feel convinced that photographic portraiture had then taken *another* and a more terrible downward step, for a *quantity* of coarse perishable products were now being offered by professional photographers in lieu of *quality* and *permanency*.

As a proof of what the public thought at that time of such portraits as this last I may mention that, one fine morning in May—the height of the London season—I spent the four hours, from eleven till three, in a handsome London studio in one of the great thoroughfares, through which it was computed that a quarter of a million of persons passed every day, and yet not a single sitter made his appearance—so highly was this collodion and paper novelty in our art then esteemed!

But the little card portraits at a shilling a piece saved the art from utter extinction. Although these were too often wretched caricatures, yet they were cheap and portable; and it was amusing to exchange them with one's friends, and make a gallery of the celebrities and notabilities of the time in suitable albums. These albums afforded a great deal of amusement and did a great deal of good, and *thus* the art was saved!

Striding over ten years I come to the next portrait of my son, taken in the usual way by my friend Mr. Whiting. It is a capital example of the collodion process, and there has been quite a "run" upon the negative for prints; but the charm of these, after all, is their *truthfulness*, as far as they go, for the negative is quite untouched.

The last portrait of him which I shall notice here is one which was taken a week ago by M. Mévius, at his establishment at Rennes. It is an excellent example of the *modern* style of photographic portraiture, in which art has a large part to play—I mean the art of the retoucher, without which the public will not be satisfied; for photographic portraiture, pure and simple, by means of collodion has at length been condemned as a miserable failure. The portrait is a very *pretty* and *artistic* one; but, unfortunately, the *likeness* has been tampered with and somewhat impaired.

We have here a proof of the *last* downward step which photographic portraiture has taken, and I believe it will be the very last; for it is impossible that the art should sink to a lower level than that in which its products are regularly handed over to a retoucher to be made *pretty*.

But enlargements are now the fashion; and in a letter from one of the great enlargers and retouchers for the profession which I received last week I was told that he had done fifteen hundred during the past year—at a price so low that he was almost ashamed to mention it, and I am ashamed to repeat it.

Comparing, then, the present with the past it does not appear that the collodion process aided by the retoucher either pays so well, as a rule, or yields such good results, as the old daguerreotype.

Two years ago I paid a visit to M. Adam-Salomon's studio, and had there the pleasure of seeing what could be effected by the great master himself in this new art of retouching and sophistication. I was shown quite a grand collection of large portraits, framed and glazed, which exhibited a vast deal of cleverness in their execution and finish; but, in spite of every attempt to be pleased with these superb representations of ladies and gentlemen in satins and velvets demeaning themselves proudly before the camera, I could not divest my mind of the idea that the originals might not have been human beings at all, but mere figures, *à la Tussaud*, got up as models for specimens—so waxen were their features, and so smooth, textureless and unreal was the whole result. But the public paid one hundred francs a piece for these portraits, and they could not be done fast enough! On leaving I passed through a chamber where there was hung a picture in which the great artist had ventured to please *himself*. It was the graceful, natural figure of a young peasant girl, from a negative quite untouched. I could not refrain from saying that I admired it more than all the rest, and a smile from my guide told me plainly enough that he was of the same opinion. The print was a pale red one upon plain paper, and mounted upon a grey board.

And now my readers may be wondering what is the practical conclusion which I draw from all this, and what is the peculiar advice which I have to offer them. Is it to give up altogether their present practice, and try to reintroduce the old daguerreotype?

No; I cannot go so far as that. The present style of photographic portrait, in which the pencil and the brush play so large a part, has its use, and must not be altogether condemned. So long as there is a demand for it let it go on by all means. Professional photographers who have their living to get must swim *with* the stream and not against it; and even if they agree with me in much that I have said, they must still, for obvious reasons, continue in their present course. But this I do think—that the art of the retoucher might often be dispensed with to a great extent, and to the saving of the pocket of the professional, if he would but study more carefully than he does the lighting and posing of his sitters. This should be the same for *all* processes; and then the question of paper, glass, or silver plate might rest with the sitter himself, if competent operators were employed.

However much the public may like prettiness combined with a little flattery in a photographic portrait, it must be remembered that vanity and love of art are not *always* uppermost in people's minds, and that the ties of affection and of friendship have also a place in their hearts. There are times when the literal truth will be appreciated for its own sake, and when nothing can properly take the place of it, and when the art of the retoucher will be looked upon with abhorrence. Under these circumstances, what process can be compared with the daguerreotype? And even if we do want multiples of the original, what so easy as to copy it by the same method?

But this fine process is not for unskilful hands. Like poetry, a daguerreotype admits of no mean between good and bad. It is either a thing of priceless value to its possessor from its being really good, or it is a horror and worth less than nothing to him. Although quite special in its character, and essentially unlike anything in the world of art, yet all the high qualities of a really skilful artist are demanded in order to make an image upon a silver plate acceptable; but when in such hands as his all the real excellencies of this fine process *have* been brought out, the result is so perfect, so truly exquisite, as to leave all other methods of pictorial reproduction from nature far behind.

If we ask why so fine a process has been given up, the answer is that it fell into unskilful hands, whose works brought it into disrepute; and thus any change was welcomed by the public as a gain. But poetry, painting, sculpture, architecture would all die from a similar reason if no artists of ability could be found to carry them properly out. Very few of the old daguerreotypists did really good work. The violin may be the most perfect of instruments, but who can endure the scrapings of a bad player? It is just the same with the process of Daguerre. THOMAS SUTTON, B.A.

NOTE ON SEPIA-TONED SILVER PRINTS.

[A communication to the London Photographic Society.]

A LITTLE while ago I was wishful to try if a print could not be made to represent more faithfully a sepia drawing than is the case with ordinary silver prints, and after a few experiments on the subject, which it will be needless to explain here, I succeeded in getting a picture sufficiently like a sepia sketch to satisfy me.

Of the process I have adopted I append a brief description; and I may add that I have found this method of printing much more easily managed than the ordinary one, consisting of sensitising, exposing, toning, and fixing. In this case the toning is effected prior to the sensitising.

I use as the basis the "Eagle" albumenised paper; but I have no doubt whatever that other good papers would answer equally well. The *modus operandi* is the following:—

Float the albumenised papers, in the first place, on a toning bath for from five to ten minutes, the bath consisting of—

Chloride of gold	1 grain.
Water	10 ounces.
Acetate of soda	20 grains.

Remove from this bath, and, when perfectly dry (otherwise stains would be produced), sensitise by placing it on a silver bath (thirty to thirty-five grains of nitrate to the ounce of water); then dry the paper again, and keep it under pressure till required for use.

After printing rather darker than the finished picture is actually required the print needs simply to be fixed in a hyposulphite of soda bath and washed and dried.

If the print be viewed by transmitted light it has a fine transparent aerial effect; and, as I have said before, the finished picture has a beautiful sepia tone.

The only important drawback to this process is that the paper does not keep well. Whether the discolouration is owing to actinic action being continued in darkness or to the action of the silver on the organic matter of the paper I cannot positively say, but rather think it is due to the latter cause. WILLIAM H. WATSON.

LIFE SIZE.

"WHAT is life size?" Owing to the great demand for enlargements this question has asserted itself rather prominently lately, and, although apparently a very simple question, it is really very difficult to make a satisfactory reply to it.

I have been in the habit of making enlargements for many years past for the profession, and it is very surprising the number and diverse opinions there are on the subject. According to Mr. Crawshay a life-size head should measure from seven and a-half to eight inches; the face, I presume, being from the roots of the hair on the forehead to the bottom of the chin. This in practice will be found a mistake, and in the majority of cases will produce a head exceeding life size.

I have sometimes received a batch of negatives, with instructions to make the faces a certain size. When the pictures have been sent home I have received a letter complaining of their being all odd sizes—some too large, and others too small. I could only refer my customer to his instructions, and on measurement the faces have all been found the size ordered. The difficulty has arisen from his not having taken into consideration the fact that the roots of the hair will vary as much as two inches in different individuals. The hair of some persons comes much lower on the forehead than in the case of others. I have frequently had a life-size enlargement thrown on my hands as being too large; but on showing it to other persons, some have said it was too large, others too small, and others that it was just right—thus proving it to be a mere matter of opinion.

Artists who are in the habit of using the enlargements merely as guides give a great deal of trouble, being so exacting in their requirements. Even when I allow them to focus the image on the paper the result is not always satisfactory; it "looks" to them not the right size. I have often suggested to artists to suspend a foot rule on a plane with the sitter's face; this, if focussed the exact size, must give the correct measurement in the enlargement.

There is often much difficulty where two negatives have to be enlarged to pair as man and wife. The woman may be of the fat or moon-faced order, and the man of the thin or hatchet-faced character. In such cases if the photographer would only take both sitters without moving the camera or head-rest much difficulty would be avoided. Both enlargements could be made without altering the focus, and the pictures would pair in proper proportion. Of course suspending a foot rule by the side of the sitter's face would be only admissible in cases where the enlargement was required for a guide only; but it would be easy to have some prominent object among the accessories —a book on a table, for instance—the size of which being known all the enlarger would have to do would be to focus the object's real size, and the rest would follow.

Now that so many negatives are taken expressly for enlarging I think it very desirable some such plan should be adopted, as it would save all trouble and uncertainty of measuring and registering the actual size from the sitter.

I believe that a properly-proportioned head should measure four and a-half inches from the corner of the eye to the bottom of the chin for a man, and four for a woman; but this is subject to great variation.

I think that the measurement giving the most generally satisfactory results for life size should be nine inches from the top of the skull to the bottom of the chin for a man, and eight for a woman. The line of skull can always be traced under the hair.

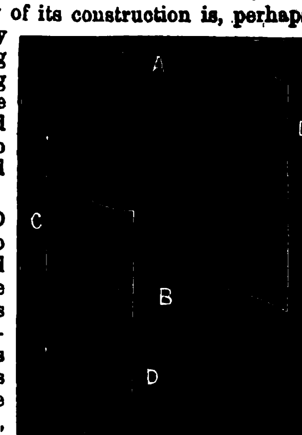
I have some remarks to offer on enlarging generally, and, with the permission of the Editors, will write again next week.

PLANO-CONVEX.

AN ALCOVE BACKGROUND.

IN these days of art-photography it will not be necessary for me to argue in favour of backgrounds having gradation over those which used to be the delight of a period—happily passed—wherein an unbroken and even tint was considered the acme of perfection, and any variation therefrom the result of defective manipulation; suffice it to say that photographers have been awakened to the value of gradation in the background when artistic pictures are desired.

Amongst the many ways of producing the desired effect on the background the earliest I remember was a curtain so fixed as to cut off the light where necessary—useful enough when light draperies were used, but objectionable when dark ones took their place. Backgrounds painted in gradation have been produced, but the alcove background has advantages over all in the means it affords for obtaining variety of effect. The difficulty of its construction is, perhaps, the cause of its not being so generally used as it might be. I purpose giving such an easy means of constructing one that any photographer can have the luxury of an alcove background which is light and easily moved, so as to give great variety of effect, and the cost but trifling.



A and B are curved iron rods, D D and C are straight rods fitting into holes drilled through A and B, and having collars to keep them the required distance apart. When this framework is ready a cloth background, such as our manufacturers supply in a great variety of tints, is stretched from A to B, when you have an alcove background both light, strong, and easily moved to obtain variety of effect. I have omitted to add the canopy, such as is used by Adam-Salomon, it being so well known, simply wishing to show an easy means of obtaining the curved ground. W. E. BATHO.

APPENDIX TO THE PAPER *ON THE MANUFACTURE OF LIMES FOR THE LANTERN.*

[A communication to the Manchester Photographic Society.]

The inferiority of the light I had here at our last meeting, compared with the good one frequently obtained at home, has compelled me to come before you again this evening to explain what I believe to be the reason, and to give you an account of the remedies I have adopted to overcome the defect.

The primary cause was a deficiency of pressure of the coal gas. Secondly: I had ten feet of india-rubber tubing from the chandelier to the lantern, six feet of which were wired, and this retarded the flow of the gas very much; so between the two I had an insufficient pressure to enable me to give you the amount of light you were led to expect.

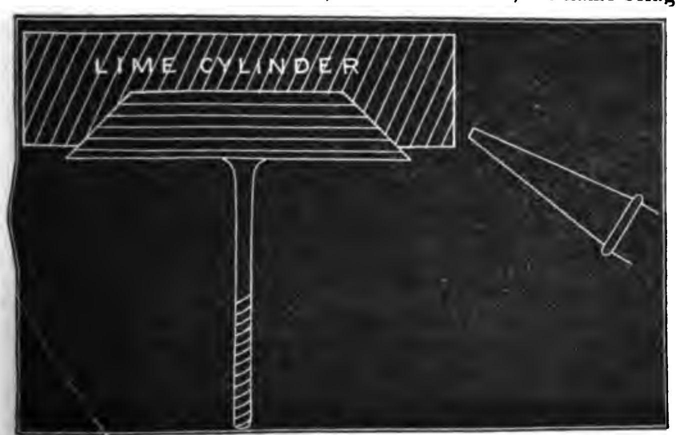
When the oxygen was turned on the hydrogen was driven back, and it required the greatest nicety of adjustment of the oxygen tap to get a proper proportion of the two gases. The blowpipe or burner I used mixes the two gases just before issuing, and requires more pressure than those with the oxygen inside the hydrogen flame.

I thought I should have to use the latter form of burner in future, where probably there would be a diminished pressure of coal gas, and was about to fit to the lantern a good one I have, when it occurred to me to make and try a jet of larger bore. I made one about double the area of orifice. The two jets are on the table—the smaller-bore one being tipped with platinum, the other all brass.

I think it fortunate that I should be baffled as I was, for it has put me in possession of a remedy I had not before thought of. Instead of having only one jet, I shall be now armed with two or three of different bores in future, the same as when you go out with lenses of different foci to your cameras. Instead of the india-rubber tubing I had last time from the chandelier to the lantern, a copper pipe is now attached, and a pressure-gauge is also applied, so that we may see what pressure we have to work with.

The next thing I have to mention is the lime cylinder. I have always been an advocate for the disc, but the cylinder is more convenient to make.

As an improvement I have, since our last meeting, made a small semicircular trough to hold the cylinder when laid horizontal, or in a line with the axis of the lenses, instead of vertical, the flame being



applied to one of the flat ends of the lime cylinder (the hardest part) instead of about the middle of the side when vertical (the softest part)—another very simple matter. I consider this a very important improvement, for the following reasons:—

Supposing a solid cylinder to be only one and a-half inch long by five-eighths of an inch diameter, we at once convert it (by laying it down) into a disc one and a-half inch thick by five-eighths of an inch diameter, both ends being usable; we thus get a miniature sun of that diameter tolerably well defined. This being so satisfactory to me I have ground down and re-made most of my lime cylinders over again, solid. No more drilling will be required now, nor any more vertical cylinders for the future.

I think a five-eighths better than a fourteen-eighths disc, because the whole of the smaller one is incandescent, and there will be more economy in the materials; also, the trough is a much easier thing to make than the disc-holder.

If the end of the lime cylinder does pit some, it can only be a good half-inch in diameter, and, if it becomes very deep, the other end is available immediately by turning the lime, end for end; then, again, the two ends can be pared off, and you have a new lime surface to go on with. About three-eighths of an inch in depth is calcined at a time, so that a cylinder may be used about four times.

The curved surface of the vertical cylinder does not give off the greatest amount of light until it has become pitted to some extent, which is really an improvement as far as that goes; but it appears to me that a flat surface at the beginning is the best under all circumstances. M. Noton.

PHOTOGRAPHIC ILLUSTRATIONS OF THE ERUPTION OF VESUVIUS OF APRIL 1872, COLLECTED AND PREPARED BY J. M. BLACK ESQ., J. P.: EXPLANATORY REMARKS.

[A communication to the London Photographic Society.]

The photographs which are the subject of this communication were collected by Mr. J. M. Black, who happened, by good fortune, to be at Naples at the time of the eruption. A portion of them were made by himself by a dry process on gelatine tissue. But those photographs are supplemented to some extent by the work of Neapolitan photographers, in order to render the illustrations as complete as possible. The entire series are now placed before the Photographic Society through the kindness of Surgeon-Major W. J. Black, of Edinburgh, the brother of the contributor of the photographs, and an old acquaintance and friend of the author of this notice.

The illustrations consist of twenty-six photographs, and represent the different phases of the eruption, the aspect of the great terminal crater of the mountain after the eruption, and the damage done by, and structural peculiarities of, the lava stream.

The great eruption of 1872 commenced on Wednesday, the 24th of April. At that time the crater was glowing with fire, lava-streams began to descend the cone in various directions, and a column of smoke rose to a great height above the mountain. This state of matters continued during the next two days, the lava-streams advancing steadily downwards along the base of the mountain, rumbling sounds and explosive detonations being heard from time to time, and the ground trembling for miles around. On Thursday night a fresh crater opened out suddenly near the Observatory, bursting up the ground and swallowing up a crowd of people who had gone up towards the base of the cone to look at the eruption. On Friday the explosions were very violent, being then heard at Naples, and showers of ashes and pumice fell at Pompeii, Cava, and to the south-east. Several craters were now obvious, emitting flames and smoke, and the eruption was about at its climax of splendour and power. The lava at this period ran down in two streams—one towards the south, dividing towards Torre del Greco and Camaldoli, and the other towards the north, also dividing, and threatening Resina, Giorgio, and Cercola. The inhabitants of Torre del Greco were at this time in full flight. The chief stream of lava in the afternoon passed through the villages of Massa di Somma and Sebastiano, sweeping away buildings and whatever obstacles opposed themselves to its path, and gradually piling up an embankment 30 feet high. Towards sunset the pillar of smoke had spread so as to conceal the mountain, and extended as far as Sorrento, towering up, in huge, fleecy, cauliflower-like folds of white vapour, 16,000 feet into the sky. Four open craters were emitting flames and ashes on the lower part of the mountain. The ships in the harbour were trembling with the vibrations of the shocks. At this time it was estimated that 200 people had been destroyed or seriously injured by the lava.

On Saturday the outburst of fire and smoke declined, and clouds of dust and showers of ashes took their place. The entire mountain and the country for miles towards the north were obscured by a pall of dust. The volcanic roar and the sound of subterranean explosions were heard twenty miles away. The villages of Massa di Somma and Sebastiano, on the north of the mountain, were at this time half buried; but the flow of the lava had ceased, and the other villages threatened (namely, Resina, Portici, Pompeii, and Reali) were now felt to be safe. They were all, however, deserted by their inhabitants, as were also Torre del Greco and Bosco on the coast, and Ponticelli, Cremano, and Cercola on the north side of the mountain. As many as 30,000 fugitives from these villages were at this time encamped at Casoria, one of the suburbs of Naples.

On Sunday the mountain was still hidden by smoke, and showers of ashes still darkened the sky. The ashes were lying two inches deep at Caserta and Salerno, and one inch deep in the streets and on the housetops of Naples.

On Monday the atmosphere at Naples closely resembled that of London in a thick November fog; the sound of horses' feet and of wheeled carriages was muffled as by a heavy fall of snow; and the ashes were in process of being swept up in heaps. The invisible mountain was roaring awfully; the pillar of smoke above its cone was illuminated at frequent intervals by vivid flashes of lightning; and projectiles were cast above the crater to a height of nearly three quarters of a mile.

On Tuesday there were still subterranean thunder and shocks of earthquake. Ashes and pumice were still ejected in showers from the cone. Thunderstorms prevailed; and heavy rain began to mingle with the fall of ashes.

On Wednesday, the 1st of May, sand and ashes were still falling in Naples, and its streets were enveloped in darkness; but the volcanic roaring had ceased, and fewer projectiles were seen. The old crater appeared to be nearly silent; but four new explosive furnaces were discharging smoke and flame around its site.

On Thursday the eruption had come to an end, thus giving eight days for the continuance of the outburst.

The chief sources of lava during the eruption were two craters situated one on the old cone and one in the Atrio del Cavallo—the spot to which horses only are available in making the ascent of the mountain, some little distance from the Observatory, and between it and the base of the cone. The side of the old cone fell in; and it was fissured from top to bottom towards the north. A deluge of lava was discharged from the base of this fissure into the Atrio del Cavallo, and then passed on over the villages Massa di Somma and Sebastiano, covering a vast tract of country fifteen and twenty feet deep, and at one time threatening the entire east slopes of the mountain. The Observatory stands on an eminence known as the Cantaroni Hill, which is connected with the base of the cone by a continuous ridge. The Atrio del Cavallo, which was reached by the lava almost immediately after its issuing from the fissure of the cone, lies north of this ridge, separated from the bottom of Monte Somma by a broad tract of old lava.

The immediate phenomena of the eruption are illustrated by a series of twenty-one photographs. The first gives a view of the mountain from the Strada Nuova, at Naples, before the eruption, showing the cone, Monte Somma, the Camaldoli hill, and the position of the coast-villages at the base of the mountain. A second photograph represents the appearance of the mountain at one o'clock on the morning of Wednesday, soon after the beginning of the eruption, with the two lava-streams diverging from the Atrio del Cavallo, on either side of the Observatory, which is situated high up in the angle between the two. A column of vapour, 12,000 feet high, is drifting to the south over the mountain. The next view gives the appearance six hours later, with the lava advancing as four streams, the two primary ones having subdivided. The villages of Massa di Somma and Sebastiano, now enveloped in the lava, lie on the extreme left of this picture. A dense volume of black smoke rises from a large fumarole in the consolidating lava just above, with the position of the Observatory a little way to its right. The column of steam and smoke is now spread above the mountain in the form of a vast pine tree, between three and four miles high, and is at this time at its greatest phase of development. Another photograph shows the position of the lava-streams an hour later, considerably further advanced towards Ponticelli and Naples, and dust-clouds beginning to fall from the fleecy masses of the smoke-column. In the next photograph of the series the appearance at half-past six in the evening is illustrated, when the folds of the smoke-columns were drawing in rapidly from their first splendid dimensions, and when the fogginess due to the dust-clouds was greatly increased.

On the following morning (Thursday), at ten, the apex only of the smoke-column was visible above the broad, thick mass of the dust-fog, and the lava-streams had reached the limit of their flow, as shown in another view. The appearance of Naples, under the still increasing haze of the dust-cloud, on the Friday morning, the third of the eruption, is represented also in its own photograph. R. J. MANN, M.D.

(To be concluded in our next.)

Our Editorial Table.

VITRIFIED PHOTOGRAPHS ON ENAMEL.
By J. SOLOMON, Red Lion Square, London.

THIS work must be estimated qualitatively rather than quantitatively; for, without any circumlocution, Mr. Solomon at once plunges headlong into his subject, which is the furnishing of directions and such formulæ as will enable a photographer to produce a photograph burnt-in on enamel.

Vitro-photography may be practised in two ways. One of these is to produce a surface which shall be more or less "tacky" in proportion as it has been acted upon by the light. When a vitrifiable powdered pigment of dark colour is brushed over such a surface it will adhere in direct proportion to the action of light, and when vitrified will show with a degree of force proportionate to the intensity of the light, the action of which is represented by a more or less quantity of pigment. This is now generally known as the "powder process," and we know that very beautiful gradation and depth may be obtained by its agency. Several formulæ are given by Mr. Solomon for the preparation of surfaces which permit of the adhesion of powder colours.

The "conversion process," as it has been termed, is another way by which the same end may be arrived at. A collodion transparency is toned in a certain way, and transferred from the glass to the enamel tablet, upon which, by the application of heat, it is burnt-in. The various toning baths, together with hints warranted by a prolonged experience, are all carefully given in detail by Mr. Solomon in his directions, in which his chief aim seems to be to leave nothing unsaid that, according to his experience, is requisite to be known in the production of vitrified enamels, which, as the author justly says, are of all artistic productions the most permanent. We welcome every effort made to popularise this branch of photography.

DALLASTYPE. By DUNCAN DALLAS.

THE Dallastype—the origin of the word we need not hint at—is a method of reproducing drawings, engravings, or typographic matter in *facsimile*. Photography is, of course, the agent employed; but with the precise details of the method adopted by Mr. Dallas we are unacquainted. There are several methods by which surface blocks may be automatically produced, some of which we have already described; whatever process, however, Mr. Dallas has adopted in producing greatly-reduced *facsimiles* of *The Times* and *Pall Mall Gazette* there can be no doubt that he has succeeded admirably. The printing is too small to be read without the aid of a powerful magnifying glass, but, being quite legible when viewed by the aid of such an agent, it shows the great power of the process employed, whatever it may be.

LETTS'S DIARIES.
London: LETTS, SON & CO., LIMITED.

EVERYBODY, of course, knows what a diary is, and *we* know, from the specimens sent by Messrs. Letts, that diaries may be something more than diaries. They may be, and are, of a variety of sizes, and some of them contain a fund of information of very great interest. To confine ourselves to one of the series: we find in it all the information for which we usually consult an almanac, together with tables of wages, weights and measures, and a capitally-engraved scale of centimetres and English inches side by side for comparison. Directions concerning passports, even for making wills, are here to be found. The prices of land in the leading colonies, and the modes of acquisition, are all treated in a brief yet clear manner. If we wish to know the principal London club-houses, Letts gives us the information; so with town, country and colonial banks, and law and public offices. We find here the names of English and foreign ambassadors and of those who constitute both Houses of Parliament, together with the salaries of the leading public officers, including those of the law courts. Some of Letts's Diaries are a veritable *multum in parvo*.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 27	Liverpool Amateur............	Free Library, Wm. Brown-street
,, 29	Oldham (Annual Meeting).....	Hare and Hounds, Yorkshire-st.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE monthly meeting was held at the Memorial Hall, on Thursday evening, the 8th instant,—Mr. W. T. Mabley, President, in the chair.

The routine business being disposed of, Mr. G. H. Wharton was elected a member of the Society.

Mr. A. BROTHERS, F.R.A.S., then communicated some particulars on the fading of silver prints. [See page 39.] He commenced by reading some extracts from articles which had recently appeared on the fugitive character of photographs, and expressed his belief that such articles were very damaging in their tendency. He then exhibited a number of silver prints, most of them taken from the *Pencil of Nature*. The first shown was more like a sheet of dirty yellow paper than a photograph, and some of those shown subsequently were very little better. In every instance the fading had taken place in that portion of the print which had been pasted or otherwise attached to the mount. One print shown by Mr. Brothers had been produced by himself for a special purpose some fifteen years since, and although it had been hastily done, and had not even been washed after the hypo. bath, it retained its original colour and freshness.

A short discussion followed, in which

Mr. PETTY testified to the inferiority of modern white paper for retaining its colour. He said good white papers in times past were made from picked white rags, while in the present day bleaching processes were much resorted to on materials less carefully selected.

Mr. JOHN HOLDING said it was difficult, almost to impossibility, to procure either drawing-papers or colours that were sufficiently permanent.

Mr. ATHERTON said years of experience had satisfied him that freshly-made starch was the best medium for mounting purposes.

The SECRETARY said the objections urged against ordinary paper and mounting boards ought not to apply to photographic paper if all the care ascribed to its manufacture had been exercised.

The PRESIDENT agreed with Mr. Brothers to some extent, but did not consider silver prints by any means permanent, in consequence of the great affinity silver was known to have for sulphur.

A MEMBER suggested that the gold toning of silver prints would tend to their stability.

The PRESIDENT said no doubt it would, to some unknown extent.

Mr. Noton read an appendix to his paper on limes. [See page 43.] He exhibited a much better light than that obtained at the December meeting. This was in some measure due to the greater pressure of gas in the mains.

The pressure of coal-gas at half-past five o'clock was twelve-tenths of an inch of a vertical column of water; at six p.m. it had increased to more than thirteen-tenths. Some oxygen was obtained from Mr. Noton's apparatus, and a trial made. The light was very poor, and the gases exploded and put out the light several times—the large bore jet being used. At seven o'clock the pressure had increased to twenty-tenths or two inches, and all went well, a good light being produced, showing the pictures well on the screen. The blowpipe was afterwards taken out of the lantern to show the naked light, and the great facility there was for removing, replacing, or substituting another lime, even without extinguishing the flame of the blowpipe. A cylinder composed of magnesia alone was tried; the light, however, was not equal to that of the lime and magnesia.

The meeting, which was a full one, passed a vote of thanks to Messrs. Brothers and Noton, and was then adjourned.

Correspondence.

REPORT OF THE MARSEILLES SOCIETY UPON BROMISED COLLODION.—HOW FAIRLY TO TEST AND PROPERLY TO LEARN THE BROMIDE PROCESS.—M. VIDAL'S PROGRESS IN PHOTOPOLYCHROMY.—THE DAGUERREOTYPE *VERSUS* RETOUCHED PAPER PORTRAITS.

THE Marseilles Photographic Society has at length published a report on some bromised collodion which I submitted to it for trial a few months ago. A committee of three members was appointed to test the process, but only one of them, M. Perris, appears to have seriously undertaken the task. He has not entirely succeeded, but has obtained very promising results and very sensitive films, and he wishes for some more collodion, which, of course, I shall send him, in order to continue his experiments. Further instructions are also required.

Although some gentlemen succeed at once with this fine process—the collodion process of the future, in my opinion—yet others do not, and I cannot but remember that I was myself for some two or three years in the latter predicament, although I persevered almost against hope, encouraged solely by my faith in Major Russell, and by what I had seen of the success of the process in his own hands, as performed in his own dark room. But now the main difficulties have been cleared away, and I find it just as certain as any other mode of taking a negative. I may, therefore, perhaps, venture to quote Virgil's line, "*Haud ignarus mal miseris succurere disco,*" and offer my aid and counsel to others who are in trouble with their experiments.

The collodion which I sent for trial contained eleven grains of cadmium bromide per ounce, equal parts of ether and alcohol, and a fair quantity of some very superior pyroxyline. It flowed properly upon the glass plate, and when excited in an eighty-grain bath gave a beautiful film. What I am going to send again will be some of the same old batch, and it will be accompanied by the following precise instructions:—

For the first half-dozen experiments to work in a room so nearly dark that it is impossible that diffused light should be a cause of fog. To put plenty of orange-coloured *paper* before the window, and not to let the sun's rays fall upon it. To leave the plate five minutes in the bath, by the watch; to wash it in a glass dish with pure distilled water, changed five times during five minutes, with much shaking. Then apply the albumen preservative, let it soak in for a minute or two, wash it off, and, *without having exposed the plate at all to light,* hold it in the hand horizontally, and treat it for ten minutes with an alkaline developer, just as in the development of an exposed image. During this time to keep it always horizontal, with the liquid flowing backwards and forwards upon it, and never to hold it up to the light. Looking down upon the film it will appear like a piece of white porcelain, and if, during this treatment, no veil or shade come over it, it will be a proof that the film was properly prepared; otherwise there was something wrong in the work. Having thus learned how to prepare a clean bromide plate, the next experiment will consist in preparing one in the same way, and exposing it in the camera before development.

The alkaline developer to be employed, and the mode of using it, is as follows:—

Make a solution of bromide of potassium, fifteen grains to the ounce, and a solution of ammonia and water equal parts. Put them into separate bottles, and let each bottle have a separate dropping tube giving the same-sized drop.

Now dissolve three grains of pyrogallic acid in an ounce of water, and add to it ten drops of the bromide solution, and five drops of the dilute ammonia. Pour this upon the unexposed plate, and let it act for two minutes; then add five more drops of ammonia, and let it act for another two minutes; repeat this addition of ammonia, at intervals of two minutes, four or five times, and note whether the film preserves its whiteness as it ought to do; or, if not, at what stage discolouration sets in. Lastly, wash it and fix it, and, if well prepared, it ought to yield a clear glass plate.

Until the pupil can go through this experiment correctly it is of no use for him to attempt a negative; but when he has mastered his first lesson he may expose his plate to a sitter in the portrait-room, giving the same exposure as for wet collodion. He must then develope in the same way as before, watching the process with the plate always horizontal, and never holding it up to the light. He must exercise patience, and not hurry the process by the too liberal use of ammonia. Looking down upon the white film he will see the image come out upon it by degrees in the most charming manner possible; and he must go on pushing the development until the whole of it is nearly lost in a mass of detail, whilst a white unexposed border of the plate still retains its perfect clearness. The image may now be washed; and as a good lesson I would recommend to treat it thus:—Cut the plate in half vertically, and treat one half with hyposulphite and the other half with nitric acid. The former half will give a negative, the latter a positive. The blacks of the former should have a greenish tint, and be quite dense enough, whilst the high lights are clear glass; and the high lights of the positive should be clear glass also. The result will show whether the exposure has been correct. The preservative in these experiments should be simply albumen one part to water three parts.

Having learned the lesson thus far, the time in the bath should be varied from three minutes to ten, and the difference noted. The pupil will then have mastered the chief difficulties in this new process, and will have learned more about it in a couple of mornings than if he had made random experiments extending over a dozen years. What I would chiefly impress upon him is to darken his room at first until he can only just see to work in it; to use glass vessels for his bath and washing waters; pure nitrate of silver; pure distilled water; and plenty of patience, perseverance, and faith.

In a letter just received from M. Vidal, he tells me he is making most satisfactory progress with his process of photopolychromy, and will be ready before long to open an establishment for this kind of work in Marseilles. He promises to send me some of his most recent specimens in the course of a few days, similar to those which he has just forwarded to the French Photographic Society. He has received a visit from Mr. J. R. Johnson, who appears to have been much pleased with his results. M. Vidal's process, it will be remembered, is for the production of *large numbers* of coloured prints in pigment for a negative, and not for the production of only one or two. His process of colouring will not, therefore, clash in any way with that to which I alluded in a recent letter to this Journal, and which is now in process of being patented in England and in France.

In another article my readers will find some remarks of mine on the present state of photographic portraiture as compared with that of twenty years ago. The art has now become quite a mixed one, and seems to please the general public very much. I am not one of those who would severly criticise this change, or denounce it. Let us make pretty, flattering portraits, by all means, even at the expense of truth, if such be required and preferred; but there are times when the literal truth will be deemed of priceless value, and an idealised portrait as quite worthless in comparison, and in that case what process is so satisfactory as the old daguerreotype? May it not then be worth while to revive it? I believe that in every large town a good daguerreotypist might now do as flourishing a business as those of old, by establishing a reaction against the present style of photographic portraiture, aided so much as it now is by the retoucher. THOMAS SUTTON, B.A.

Redon, January 16, 1874.

THE FORTHCOMING ELECTION AT THE LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I beg that you will give publicity to the fact that, although my name has been published as a candidate for the office of President of the Photographic Society, it appeared without my having been consulted, or my permission obtained for its insertion; and I distinctly decline the proposed honour, desiring that my name may be *expunged* from the list.

I have written to Mr. Stillman, the proposer of the list in question, with the above object, as also to the President and the Secretary of the Photographic Society.—I am, yours, &c., J. H. DALLMEYER.

19, *Bloomsbury Street, London, January* 17, 1874.

To the EDITORS.

GENTLEMEN,—I find Mr. Stillman and Mr. Hughes wish me to withdraw their names from the list I have proposed for the Council.

I should like to take the opportunity of saying publicly why I placed their names on my list, and why, if it should happen that they are elected, they ought to consent to serve on the Council.

One of the things that struck me most forcibly when I was a member of the House of Commons was the importance of an active and strong opposition to keep the Government well up to its work, and my experience since, when acting for some years as private secretary to a cabinet minister (in which office I saw even more behind the scenes of parliamentary government) has strongly confirmed me in that opinion.

Now, the agitation that has been commenced owes, I believe, its origin to Messrs. Stillman and Hughes, or, at all events, they are two of the principal actors in it; and I think, therefore, if any changes are made through their endeavours, they ought to go themselves on the Council to carry out the changes, and not leave the work to members much weaker than themselves. They are both eminently qualified for the post, and I feel sure the members of the Society would be glad of their services. I hope, therefore, they will see the force of my arguments, and will, if elected, serve.—I am, yours, &c.,

January 19, 1874. H. STUART WORTLEY.

COLLODION FORMULÆ.

To the EDITORS.

GENTLEMEN,—Will you kindly allow me to correct an error in the formula I gave in my article, entitled *Collodion Half-a-Crown Per Pound!* in this year's ALMANAC? I should have given one hundred grains of pyroxyline to twenty ounces of solvents, and not one drachm, as stated.—I am, yours, &c., THOMAS FORREST.

Cambrian Studio, Pont-y-pridd, January 20, 1874.

ANSWERS TO CORRESPONDENTS.

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

A COUNTRY MEMBER.—We cannot insert any anonymous communications on the subject.

LUX.—Parchment paper can be obtained from numerous stationers in London, or from Messrs. De la Rue & Co., the patentees and manufacturers.

COLLODION.—See leading article on specific gravity, and also Mr. T. Forrest's letter—both in the present number. Use the strongest solvents of those named by you.

BICHROMATE.—You have certainly made great progress since you last wrote. Try the effect of a longer exposure, by which the film will be less absorbent of water, and the prints, in consequence, much softer.

G. P.—While we know the optician named to be one of the best in the world, we are quite unable, from personal experience, to give an opinion upon the peculiar class of portrait lenses respecting which you inquire, never having had an opportunity of trying one.

FANNY.—In order to arrest the fading of the daguerreotype remove it from the case, hold it by one corner with a small pair of pincers, and pour over it a solution of cyanide of potassium of sufficient strength to remove the blue stains from the margin. Wash with distilled water and dry over a spirit lamp.

"RAPIDO-MANIA."—Rapidity in a lens is determined by its aperture when compared with its focus. If there be two lenses of the same focus, and one has either twice the aperture or is worked with a stop twice the size of the other, it will work in one-fourth of the time. See an article on this subject at page 25 of our ALMANAC for 1870.

GEO. P. KNARSTON.—We are always ready and willing to assist learners by offering such advice and information as they may require; but we do not undertake to teach photography *ab initio*, nor can we offer advice as to any special maker or dealer from whom you should purchase materials. Ample information on this topic is to be found in our advertising pages.

THE PHOTOGRAPHIC SOCIETY.—We have received several letters on the subject of the management of this Society, but except in a few instances they have not been attested by the signatures of the writers. One, indeed, goes the length of saying that he would have appended his name but for the fear that hostile feeling would be engendered against him, which, as a professional photographer and an exhibitor at the Society's exhibitions, might operate injuriously.

A PHOTOGRAPHER (Smithfield).—While it is not desirable to have brushes and combs on a side table in the studio in the absence of a special dressing-room, we cannot imagine that their presence would at all give umbrage to even the most fastidious sitters, assuming there is perfect cleanness on the part of the photographer. If really good pictures be produced minor matters of that kind will not deter people from coming for their portraits.

M. C. D.—The yellow stain in the print is sulphide of silver. It is caused by a decomposition of the hyposulphite of silver before it was dissolved by the hyposulphite of soda. It may possibly have arisen from the print having been touched by fingers which were moist with solution of hyposulphite of soda. It will never occur if care be taken to handle the prints with clean hands and to fix them in a new and strong fixing bath.

SIGMA.—The difference between positive and negative spherical aberration is as follows:—In a lens in which the former is in excess parallel axial rays falling upon the lens will be so refracted by the lens as to bring those rays transmitted by the margin to a focus nearer to the lens than those which pass through the centre. Negative aberration is of the contrary nature. In a lens possessing this quality the centre possesses more magnifying power than the margin.

R. SMITH.—The portraits evince great manipulative skill, but want of knowledge as to the best way to place or pose the sitter. Obtain a few of the best examples of portraiture that *can* be obtained, and imitate any of these when placing your sitter. In a short time you will thus acquire facility in posing your sitters in graceful and easy positions. Fine photographic portraits are now sold all over the country; hence you will not experience any difficulty in obtaining a selection.

H. R. S.—You somewhat misunderstand the meaning of the term "hardness." It has nothing whatever to do with sharpness, or with any phase of definition whether good or bad. A "hard" picture is one in which the transition from the highest lights to the deepest blacks is too sudden and abrupt—one, in short, in which there is little or no half-tone. Softness implies an ample degree of modulation, together with vigour; if the latter quality be wanting the picture is *too* soft.

D. H. HILL.—To dissolve a half-sovereign place it in a beaker containing four drachms of hydrochloric acid and two drachms of nitric acid. Place the beaker on a sand bath and raise the temperature to a moderate height, taking care that it shall be considerably below the boiling point. A temperature of 160° Fah. will answer well. In somewhat upwards of twenty minutes the gold will be dissolved. If from using too weak acids the quantity be not sufficient to dissolve all the gold add a little more of the mixed acids, but no more than is barely necessary to effect solution. Next dilute this strong solution by adding a few ounces of distilled water, and into this pour a little of a solution of bicarbonate of soda until effervescence ceases. The copper which was present in the coin as alloy combines with the carbonate of soda, and may be removed by filtration as carbonate of copper, while at the same time the acids are neutralised. To the stock solution add next a few drops of hydrochloric acid, and in this state it will keep indefinitely.

RECEIVED.—Walter B. Woodbury (in our next); G. W. Bracey.

TRANSPARENCIES.—The beneficial effect of gelatine as a restrainer in developing plates prepared by the bromide emulsion process is admirably illustrated by some transparencies of a very difficult class of subject which have been made by Colonel Stuart Wortley, and which he has left at our office for the examination of those who feel an interest in this branch of photography. The utmost purity and detail abound throughout these pictures, which represent a forest scene, with undulating land in the immediate foreground.

COLOURING PHOTOGRAPHS.—A correspondent, "Alpha," sends for the benefit of his brother photographers the following method of colouring photographs, which, he premises, is not new, although apparently but little known:—"1. Take a sheet of glass, give it a coat of enamelling collodion on a substratum of wax in ether, and let it dry.—2. Take a photograph, colour it on the back with transparent water colours or Judson's dyes many shades too strong to be natural, for making it transparent impoverishes the colour more than one-half. When dry put it into a dish, and cover it with methylated spirits for five minutes or longer.—3. Have mixed beforehand as thick a solution of picked gum arabic as you can make, to which add eight or ten drops of glycerine to each ounce of the solution, to keep it from cracking when dry. Take the photograph without drawing off the spirit more than can be helped, and plunge it so as to cover it in the gum solution (in a dish). It will curdle and turn white at first, but will come all right when dry. Let it stay ten minutes or longer.—4. Now remove the photograph from the gum solution, and lay it face down on the glass No. 1, and proceed to rub out the air-bubbles, if any. Let it dry, cut round the edges, and strip from the glass.—5. Mount by putting a white or coloured cut-out oval mat at the back, with white thin card behind that, and the picture is finished."

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 717. Vol. XXI.—JANUARY 30, 1874.

A NEW PRINTING PROCESS.

We recollect that when writing, several years ago, on the subject of combinations of oxalic acid and iron and their application to photography, we urged upon photographers the desirability of bestowing more attention upon these compounds than had previously been the case, as it was probable they would eventually be found to be of great value.

From an article in another column it will be seen that Mr. Willis, jun., has recently entered very thoroughly into this subject, and has evolved from his experiments a printing process of practical utility, which we think will, sooner or later, prove to be one of great value. Previous to speaking of the *rationale* of Willis's new process a few words of a chemico-historical nature will be desirable. Although our remarks may appear to be somewhat disjointed, as a whole they will tend to show the action of the latest combinations of chemicals which tend to produce a certain result.

We have, first of all, to take a retrospective glance, and direct attention to the investigations of one whose memory is revered by all scientific photographers. Sir John Herschel, in 1832, communicated to the British Association for the Advancement of Science, at Oxford, the details of a process in which platinum played a part; but it was of no practical value. Subsequently he experimented with the oxalate of the protoxide of iron (ferric oxalate, according to modern nomenclature) combined with the salts of platinum. He found that if paper were prepared with a solution of the oxalate and a solution of the neutral chloride of platinum it would be sensitive, so that a darkening action would be set up by the light, which would go on after its removal from that influence. Sir John Herschel's experiments unfortunately went no further. He found that a bleaching action commenced, and that unless an additional quantity of the oxalate were applied all evidence of solar influence would be erased. This, so far as we can discover, was all the length to which the eminent *savant* had advanced in the matter.

We now shift the scene of action slightly. The same experimentalist discovered special wonderful and beautiful properties in certain ferric salts. If the persalts of iron are exposed to light in contact with organic matter they are reduced to the state of protosalts. Arising out of the discovery of this fact were several applications of that principle. For example: the ammonio-citrate, the ammonio-tartrate, and the potassio-tartrate of iron are all affected by light. If paper prepared with these substances be exposed under a negative a certain change takes place, in consequence of which the parts subjected to luminous action react on certain chemicals in a different manner from the non-exposed portions, which is proved by brushing the paper over with solutions of silver or gold, which are reduced by the protosalts of iron, but are unaffected by the other salt.

In like manner uranium, when applied to paper in the form of the nitrate of that base, is decomposed by light, the result being that the decomposed portion in its turn is capable of decomposing certain metallic salts which may be applied as developers, and which are reduced in a greater or less degree.

But of all the salts of iron acted upon by light we know of none that is a greater favourite than the oxalate of iron and ammonia, the citrates and tartrates ranking rather lower than that. We could describe numerous photographic experiments which might be conducted with this salt, but they would occupy too much space in an article like the present. When paper is prepared with it, and is then exposed for a brief period of time to light, followed by a wash of ferridcyanide of potassium (red prussiate of potash) a picture of a strong blue colour is at once developed. Other developing agents produce pictures in different materials and in different colours.

Mr. Willis, in his recent investigations, now happily brought to a successful issue, seems to have determined, first of all, upon making his pictures in the most stable substance he could think of, such as platinum or iridium; and, in searching for a good reducer of these, his attention was directed to ferrous oxalate, which, we may state, is well known to chemists as a beautiful lemon-yellow powder, insoluble in water and in most other menstrua. For some time his experiments with this subtance yielded no satisfactory result, but at last he discovered that a solution of it in the neutral oxalate of potash, especially if hot, instantly precipitated the metal from the ordinary chloride of platinum. In other words, he found that a solution of ferrous oxalate in potassic oxalate reduced salts of platinum to the metallic state, and his new process is founded upon this reaction.

Fer*rous* oxalate can be produced by the action of light upon fer*ric* oxalate; hence paper coated with the last-named salt, and exposed to light for a suitable time under a negative, will receive a positive image consisting of ferrous oxalate.

Now, if we suppose the paper to have received a coating of chloride of platinum previously to the application of the ferric oxalate, then after exposure under a negative the surface of the paper in all those parts which have been acted on by light will support a stratum of platinum salt in contact with ferrous oxalate, while in those parts not acted on by light the platinum salt will remain in contact with ferric oxalate. The ferrous salt, although it has been formed in contact with chloride of platinum, does not reduce the latter salt until the paper supporting these salts is floated on a solution of potassic oxalate, when the ferrous oxalate is dissolved, and at the moment of solution reduces the metal from the platinic chloride. As the ferrous oxalate is formed only on the parts which have been exposed to light it is evident that the platinum also will be reduced on those parts only, and consequently we shall have obtained from a negative a positive print in the metal platinum. From a careful study of these reactions it will be evident that salts of other metals, such as gold and iridium, may be used as well as platinum.

The specimens of this new process which we have seen are exceedingly fine, and possess the most delicate gradation with much vigour. Their permanence is undoubted, as every chemist must at once perceive; and it only remains to say that the exposure required under the negative is about one-third of that required in the ordinary process of silver printing. Mr. Willis, Jun., must be congratulated upon the successful manner in which he has solved this interesting problem.

REFORM IN THE LONDON PHOTOGRAPHIC SOCIETY.

This Society occupies such an exceptional position that all its movements are public property. It is not the first time that its internal troubles have been calmly watched by outsiders; but in the present instance it is not a journalistic difficulty, nor a personal squabble between some of its dominant members. It is a battle of principle—a struggle between the narrow, antiquated policy which has brought odium on its rulers and a broad and enlightened system of reform which will place the Society on a higher level than it has ever yet attained. The sympathies of all generous minds must be with those who are engaged in this uphill work.

It is always an unpleasant task to attack existing institutions; and to attribute bad motives and personal ends is ever the first device adopted by the upholders of abuses. It is a mean and paltry attack, and always fails; for reform must triumph in the end. If the institutions assailed cannot be defended, there is always the ready means at hand of ascribing improper motives. Some people have faith in the old saying that if you throw dirt enough some will be sure to stick, and so they are liberal with the mud. The present struggle is no exception to the rule.

When the cry arose for reform, instead of meeting it on the broad ground that none was needed, the movers were said to be actuated by impure motives, by wounded vanity, by disappointed ambition, and that they were quarrelsomely inclined. Even supposing that such were true, it is but a paltry attempt to shunt the main argument—a mere evasion to lead the mind from the real things at issue. The main point before the members is that reform is needed; the Council—the governing body—is not selected on a method calculated to give satisfaction to the members at large. It is wrong in principle for the governing body to select themselves; to retain themselves in power for ten or a score of years, or even for a lifetime; to eject whom they think proper by arbitrary rules, and to replace for private reasons apart from fitness for public duty. Such is the system that now exists; and it is against this, and the glaring abuses that follow, that the cry for reform has arisen.

It is notorious that for years past no member has had a chance for a seat at the Council except by the private influence of some of the ruling section of the Council, or unless he has had a handle to his name; and then, known or unknown, on toadying principle, he has been introduced. And further: if it be found that an individual will not work to suit the views of the rulers of the Council, at the earliest occasion he has been ejected, or the treatment he has received has been such as, from self-respect alone, he has been obliged to resign. This explains the recent resignations, and the non-attendance of others who have not resigned.

It is in the nature of bad institutions to corrupt men and to establish injurious practices. This system has gone on so long that certain traditions have been formed in this Council, one of them being that whatever takes place at its sittings must not be spoken of out-of-doors. Sometime since Mr. Stillman had the courage to ignore this understanding, and, in a letter to this Journal, alluded to matters at the Council. From that time he became a marked man, was declared "disloyal," and on the next occasion he was ejected from the Council and his name not put down for re-election.

Now, what is there in this managing committee that permits its constituting itself into a "Council of Ten" or a "star chamber?" or what is there in its deliberations that should not be published abroad? Men do not surround themselves with the conditions of privacy if their deeds will bear open examination. Contrast this method with that of some photographic societies, where the meetings of the committee are not only open, but where the members are invited to be present. But the Council of the London Photographic Society has become so exclusive that it has virtually created itself into a caste—a sort of higher grade whose transactions are to be concealed from the rest of the members.

When the requisitions were found to be signed by some of the members of the Council the rest assailed them as being false to their trust, as having been guilty of unworthy conduct, and as derogatory to their caste. This treatment was persisted in until they felt compelled to resign. Can it be wondered at that these gentlemen should seek the aid of their fellow-members to reform this lamentable condition of affairs? It must be remembered that the reform movement starts from these gentlemen, who, seeing the abuses within the Council, were convinced by their experience that until the whole system was changed the Society could never be properly managed. The evil crops up everywhere, and at no period is it so marked as in connection with the annual exhibition. The Council has the whole arrangement of it—the hanging of the pictures, the determining and the awarding of the medals, one portion forming the jury, and giving to their fellows the lion's share of the medals.

In speaking of the Council of this Society it must be borne in mind that it is not an unmixed body. It is composed, practically, of three sections—one, the ornamental members, who rarely take part in its proceedings; another, formed of honourable gentlemen, who earnestly strive, despite the wretched system, to work for the general good; and the ruling section, being those who delight to have everything their own way. These are they who oppose the proposed changes, knowing that if they are made they will lose the power they now possess. Although condemning the Council as a whole, it is but fair to make distinctions between the elements of which that body is composed; otherwise justice would not be done to some who would certainly not lend themselves to acts that are done in the name of the Council.

It is no use, however, to invidiously name individuals. Before the present parties were in power the same complaints were made of their predecessors; and whoever is in office under the existing system will be tempted to go on in the same way. It is the whole system that is wrong, and the present movement is directed against the system and not against the individuals who hold the offices. One member expressed the idea clearly when he said—"Individually I have nothing to say against any one gentleman who is on the Council, but, collectively, I object to them all."

It ought to be stated that though only thirty or forty have signed the requisitions, this does not by any means comprise the whole of the London members who are known to be desirous for reform; they are only the members who in a short time could be got together to compare their views. We are sure that the bulk of the country members are deeply indebted to the metropolitan ones for taking the active part in which the former are prevented, by non-residence, from personally participating. And we may say, further, that if the present opportunity be not taken advantage of, by effecting reforms and placing its management on a broader basis, the Society will receive such a shock from the wholesale resignations that will pour in from town and country as to seriously paralyse its energies.

This will only be the prelude to the ignominious end experienced by another Society once great in its day, and which was based on the same model—the Photographic Society of Scotland. This Society had plenty of funds, had ornamental members at its head, for years held its annual exhibition, was lavish of its medals, and yet died out. And why? Because it ignored that which must ever be a vital element in any society—the body of working members. We remember being present on the occasion of a paper being read by Sir David Brewster when only *four* members were present to hear it, and this was not an unusual occurrence.

No society can continue to exist unless the body of the members take an interest in its proceedings, and it is this particular class that has risen in rebellion against the present Council; and if *they* leave or cease to take an interest in its proceedings the Society must die of inanition. Hence it is a dangerous thing to set the members at defiance, as is being done by the ill-advised proceedings of the Council of the Photographic Society.

NITRATE OF BARYTA IN THE NEGATIVE BATH.

The employment of nitrate of baryta in the nitrate bath for sensitising collodion plates has been proposed within the last few months by Mr. A. L. Henderson—the special effect intended to be gained being the diminution of the liability to the formation of pinholes from excess of iodide of silver. How this is effected is not quite easy to perceive, as the result of direct experiment does not lead us to suppose that iodide of silver is soluble to a greater extent in very dilute solution of nitrate of baryta than in a solution of nitrate of silver; for this, it appears to us, is what we should be led to expect from the statements which have appeared from time to time.

e think this matter deserving of somewhat more attention than been accorded to it, and that experiments upon a rather consider- scale should be undertaken with a view to ascertain definitely, e first place, whether the addition proposed really affects the bility of the iodide of silver, or whether the improvement in the king of a bath of the combined nitrates may not be due to other es.

will be remembered that, in the early days of collodion, one of most successful developing agents employed for the production rilliant positives on glass (for at that time the taking of nega- was not so generally the object in view) was a strong solution rotonitrate of iron, or, rather, a mixture of protonitrate and sulphate of iron. The formula recommended by Dr. Diamond— we think, was the first to suggest the use of this compound— to boil in a Florence flask two parts of sulphate of iron, one of nitrate of baryta, and eight parts of water. As soon as the salts had dissolved a copious white precipitate was thrown , which was separated by filtration, and the clear greenish fluid oyed to develope the image. Now one of the effects produced e use of nitrate of baryta in the negative bath appears to at after development and fixing in the usual way the film rs somewhat opalescent upon drying. It does not, therefore, improbable that the introduction of this salt may have an effect nticipated, but that the collodion film being permeated with te of baryta as well as with nitrate of silver the action of the ulphate of iron in the developer causes the formation of nitrate n in the film itself, and that in that nascent condition it may be effective as a developer than the simple protosulphate of iron. such a decomposition *does* take place in the film the fact of the scent appearance of it after drying seems to demonstrate.

all events, we think the matter deserves a much greater nt of investigation than it seems to have induced; and, if some r amateur readers (and it is usually amateurs who take up these ions to work out) would enter upon a series of experiments haust the question, it would be a work which might prove of er importance than at first sight one may be led to suppose.

are aware that Mr. Henderson has been making further ex- ents during the past week which have, we believe, confirmed in the high estimation he originally accorded to the addition rate of baryta to the negative bath. These experiments we soon to be able to record.

PATENTED INVENTIONS.

No. III.—A NEW PRINTING PROCESS.

ave much pleasure in describing this week a new process of ng. In an article in another column the reader will see a ed account of the various chemical reactions involved in that ss, as well as some matters of a somewhat historical character y allied to the principles which underlie it.

gentleman by whom the new process has been discovered and ted bears a name very favourably known to photographers in ction with the discovery of another printing process of much —the aniline process—which, very unfortunately, has never thrown open to the photographic world, as the firm who ased the patent (Messrs. Vincent Brooks, Day and Co.) have it to be more advantageous to reserve the working of the pro- to themselves than to grant licenses to facilitate its being worked rally. Mr. William Willis is well known to be the inventor of niline process; and the inventor of the process we are about to be bears the same patronymic, although the two inventors therwise distinct persons, still standing, however, in the close onship of father and son. The inventor and patentee with we have now to do is Mr. Willis, *Junior;* and, at the outset, ngratulate that gentleman on having introduced a process which, lieve, will be found not only novel but really useful.

preamble to the specification sets forth that the invention has objects improvements in the chemical treatment of the surfaces per, wood, and other suitable materials employed for receiving images from photographic negatives, or from any other objects interposed between the light and such prepared surface.

The mode in which this is effected is by the application of simple or compound salts of platinum, iridium, or gold, or a mixture of such salts. After this has been dried the surface may, or may not, receive a coating of the salt of another metal. After being dried the surface receives an application of ferric oxalate or tartrate and again dried. The paper is now ready for exposure under a negative, the exposure being sufficient as soon as a faint brown image appears. The paper is then removed, and on being brushed over with, or floated upon, a solution of the neutral oxalate of potassium the feeble brown image becomes converted into a strong and intense black.

The above is the process as it may be generally stated; but Mr. Willis describes various methods in detail by which the principles of action may be successively applied in practice. For example :—

First Method.—A ten-grain solution of chloro-platinite of potassium is applied to paper. When dry a forty-grain solution of nitrate of lead is then applied, followed, after drying, with a wash of a sixty-grain solution of ferric oxalate with as little oxalic acid as is sufficient to render the oxalate soluble. In this state, after being dried, it is ready for exposure, after which operation the print is floated on a hot solution of potassic oxalate. The picture is now washed successively in a weak solution of oxalic acid, plain water, hyposulphite of soda, with a final rinse in plain water.

Second Method.—Proceed as before directed, only substitute for the nitrate of lead an eight-grain solution of nitrate of silver; and, after removing the prints from the weak solution of oxalic acid, they are finished by an immersion in either a *strong* solution of chloride of sodium or in a *weak* solution of this salt, followed by a weak solution of ammonia, supplemented in both cases by a slight wash in plain water.

Third Method.—A twelve-grain solution of platinic bromide is applied to paper, which, after being dried, is then coated with a strong solution of ferric tartrate, and again dried. It is now exposed under the negative, and the weak image thus obtained is strengthened by floating it upon a hot solution of potassic oxalate. After immersion in a weak solution of oxalic acid the print is washed in plain water and dried.

The foregoing methods are sufficient to afford an idea of the operations, which are susceptible of several variations, or of being altogether inverted.

The special "claim" in this patent for the production, on suitable surfaces, of photographic pictures in platinum, iridium, and other metals, is the application of solutions of potassic, ammonic, or other suitable oxalate to such surfaces after they have been exposed to light under a negative or other suitable object, and which surfaces have been coated previous to such insolation with ferric and other salts substantially in the manner hereinbefore described.

For a further account of this process see an article in our first page.

We observe that Mr. Brothers has been making some observations on the condition of certain prints in Mr. Fox Talbot's *Pencil of Nature*—a photographically-illustrated volume which was published in 1844; and, while he admits that some of these prints are faded so badly as to be almost indistinguishable, he is still unable to arrive at the conclusion that photographs therefore, as a necessity, fade. We have long since arrived at the same conclusion, and from the same data, viz., the state of the prints in the *Pencil of Nature.* Mr. Brothers cites the condition of one print in particular—the view of *The Boulevards.* In our copy of the work we find that this print is still bold and vigorous in tone—indeed, quite as good as *some* of the pictures which were in the last Photographic Exhibition; that is, speaking of it as a whole. Unfortunately, the margins of the picture proves to be an exception to the otherwise general excellence by which it is characterised, for they have faded to a dingy yellow. So it is with the other pictures in the volume; the margins have faded, the rest being quite vigorous and bright. The cause, as suggested by Mr. Brothers, is undoubtedly to be found in the mounting materials. Conversing with Mr. Talbot on this subject, he told us that the pictures were entrusted to a bookbinder to mount, and he learnt afterwards that the paste by which they were mounted contained alum, although, fortunately, he had adopted the precaution of instructing the bookbinder to apply no paste except to the margins of the prints. This peculiarity in the mounting is at once seen upon bending the mount, when the cockling of the photograph shows that it is to a great extent unattached to the card. The conclusion to be drawn from this is obvious—plain, even untoned, photographic prints do not necessarily fade. It is interesting to speculate upon the condition in which Mr. Talbot's prints would now be had glue, fresh starch, dextrine, or other mounting agent been used in attaching them to the mounts.

THE STRONG ALKALINE DEVELOPER.

Amongst the novelties in our art which have been brought forward during the past year—some progressive, others (according to Dr. Nicol) retrogressive—we must include the change in the formula for making the alkaline developer for bromide plates, suggested by Colonel Stuart Wortley, as belonging certainly to the former class.

I have lately made the following instructive experiments with two alkaline developers—one made according to the old plan, the other according to the new—and the results have cleared away any lingering doubt that may have remained in my own mind as to the superior efficacy of the latter.

The old alkaline developer, as originally published by Major Russell, consisted of a three-grain solution of pyrogallol in water, to which were added one or two minims of a five-grain solution of bromide of potassium and one or two minims of ammonia, although the addition of the potassium bromide was not always insisted on. This was the formula which I employed for some years with but slight modification.

The new formula consists in greatly increasing the dose of potassium bromide, and at the same time that of ammonia in a corresponding proportion.

The following experiments, made by me a week ago with scrupulous care, will show the difference of result produced by a change from the old to the new formula:—

A stereoscopic plate, having been first marked transversely across the back by a diamond so that it could be broken in half after the exposure, was coated with a ten-grain cadmium-bromised collodion, excited in an eighty-grain bath for ten minutes, thoroughly washed so as to remove all the free nitrate, coated with diluted albumen, and exposed in a binocular camera for half the time that I should have given to a good common wet collodion plate. It was then broken in half, and an alkaline developer made according to the old plan was applied to one of the halves. The image appeared in the usual way, and by the aid of another minim or two of ammonia came up to good printing density, with all the details well out, and the exposure as nearly right as could be. The old developer seemed, therefore, to be a success, and to leave little or nothing to desire.

The other half of the plate was next developed by the new method; that is to say, by a three-grain aqueous solution of pyrogallol, to which were added ten minims of a fifteen-grain solution of potassium bromide, and five minims of a solution of ammonia composed of equal parts of ammonia and water. The reader will observe that this developer contained thirty times as much potassium bromide as that used in the first experiment.

No image at first appeared, not even a trace, until more ammonia was added to the solution. It then gradually came out, retaining always the clearness of the unexposed border of the plate behind the wood of the dark slide, until, after frequent additions of ammonia, such a mass of detail was forced out in the shadows, and such an intolerable amount of flare produced from the sky over adjacent objects, as proved the exposure to have been at least five times too great!

Now, as both halves of the plate had been equally exposed, it follows that the old-fashioned developer had failed to bring out fully *all* that light had effected upon the film; and yet it had done its best, for I had continued to add ammonia until the premonitory symptoms of incipient fog occurred.

In the new and strong developer, containing more restraining bromide and more ammonia in proportion, we have, therefore, the means of arriving at an equally good negative *with a much shorter exposure.* In fact, by working in this new direction, I have reason to hope that instantaneous portraits may be taken in an ordinary light in an ordinary studio.

The utmost limit to which I have yet gone in the addition of restraining bromide to the developer has been to add to the three-grain solution of pyrogallol one grain of potassium bromide—that is to say, a hundred times as much as Major Russell at first recommended; and on adding ammonia in a corresponding proportion a perfectly good negative was obtained. Where, then, does the limit lie to this strengthening of the developer—not with pyrogallol, but with the other ingredients? I cannot say; but there is an important field open for experiment.

Another question which arises is—How will *chloride* of silver be affected by this new alkaline developer? It has been proved that chloride of silver, *without* having been exposed to light, is so readily reduced by the old alkaline developer as to be useless for the camera. But will the new developer have the same effect? May we not be able, by means of a *large* dose of restraining bromide and a *small* dose of ammonia, to develope an image upon *chloride* of silver? and may we not hope to find the chloride, when treated in this way, more sensitive even than the bromide? Chlorine has a weaker affinity for silver than bromine has, and also a stronger affinity for hydrogen; ought not chloride of silver, therefore, to be more sensitive than bromide?

Iodine has the strongest affinity for silver, bromine next, and chlorine least. Iodide of silver is not affected at all by an alkaline developer, however strong. Bromide of silver is reduced in the degree which has been found suitable for our purpose, and chloride of silver too readily to be of any use to us. But may not this too ready reduction of the chloride of silver be held in check by a larger dose of restraining bromide in the developer? Here is a new and important field open for inquiry.

Our next great step in photography must be in the direction of more sensitive films, which may be kept for at least a whole day without losing their good qualities. All those who have time to devote to experiments should work in this direction.

But, after all, it seems to me that iodide of silver, *plus* free nitrate, may be the most readily affected by light of all the haloid salts of silver, only we have unfortunately no good means of developing the image. With our common acid developers the feeble details in the shadows are destroyed by the acid before any precipitate of silver from the decomposing developer can take place upon them. In short, the acid developer seems to be wrong in principle and always open to this objection, so as to be only suitable for long exposures. If, as there is strong reason to believe, the latent image is composed of oxyiodide of silver—that is to say, of oxide of silver in combination with the iodide—then, since iodide has the strongest affinity for silver of all the three halogens, the latent image ought to be formed more readily upon it than upon either bromide or chloride; but, unfortunately, we do not yet know how to develope properly the image upon iodide of silver. All the free nitrate ought to be washed off the film *after* the exposure, and then a developer applied which has not only a powerful affinity for oxygen, but also for iodine.

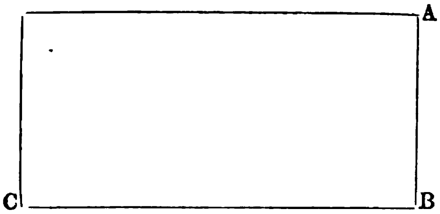
In our present mode of alkaline development the bromine of the exposed bromide of silver goes to the ammonium, and the oxygen of the ammonia, as well as of the silver oxide, to the pyrogallol; but in the case of iodide of silver, the silver will not part with its iodine, and therefore the process fails. What we want is a solution of pyrogallol, with the addition of some oxidised element which shall have a feeble affinity for oxygen, but a stronger affinity for iodine than silver has. The iodine of the latent image would then go to this element, and its oxygen and that of the silver oxide to the pyrogallol, and development would take place. But even then a proper restrainer would be required, so that the unexposed iodide of silver might not be reduced at the same time as that which had received the impact of light.

This suggests another question in reference to our present alkaline developer—Is ammonia the best alkali to add to it? May not some other element better than ammonium be found, which has a feebler affinity for oxygen and a stronger affinity for bromine? The use of carbonated instead of caustic ammonia is clearly a mistake, since the carbonic acid can only enfeeble the developer without any compensating good effect, and I observe that it has now been generally given up. I have never used it myself, having believed it to be wrong from the very first. Thomas Sutton, B.A.

GRADUATED STRIPS FOR PHOTOMETRICAL PURPOSES.

In the pages of this Journal, on the 12th of May, 1871, I called attention to a method of preparing graduated strips for photometrical purposes—a method which involved the use of no other apparatus than a box with a hole in the lid. In subsequent numbers of the

Journal I gave the formula which I had deduced for calculating the various degrees of exposure received by different portions of the sensitised paper.



Let the figure represent a section of the box in question, the line C B the surface on which the sensitive paper is laid, and the point A the position of the hole through which light is admitted. Let x be used to denote the position of some point between C and B at which we desire to know the intensity of the light as compared with that falling on the point B, then the formula in question was as follows:—

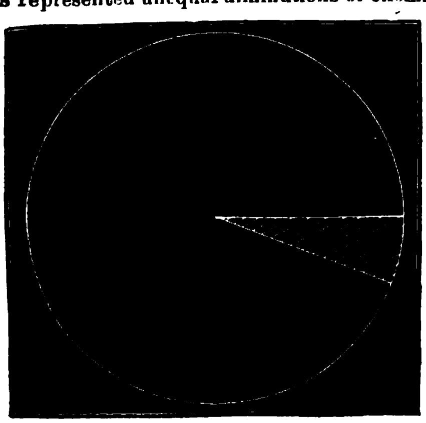
$$\frac{A\,B_4}{A\,x_4}$$

At the commencement of a series of experiments, to the results of which I shall hereafter invite the reader's attention, I calculated the intensities of the light falling at intervals of half-an-inch along the line C B, in the instance of a box whose length is six inches and whose depth is three. The hypothenuse (or line A x) was in each instance calculated. The intensity of the light was then deduced by the formula given, and, together with the difference of intensity as compared with the preceding point, is given in the subjoined table:—

Distance from B in inches.	Hypothenuse or distance A x.	Intensity of Light.	Diminution of Intensity.
0·0	—	1000	—
0·5	$3\frac{1}{25}$	948	52
1·0	$3\frac{4}{25}$	811	137
1·5	$3\frac{9}{25}$	666	145
2·0	$3\frac{15}{25}$	482	184
2·5	$3\frac{22}{25}$	343	139
3·0	$4\frac{6}{25}$	250	93
3·5	$4\frac{15}{25}$	180	70
4·0	5—	129	51
4·5	$5\frac{10}{25}$	95	34
5·0	$5\frac{21}{25}$	71	24
5·5	$6\frac{6}{25}$	53	18
6·0	$6\frac{18}{25}$	39	14

From the above table it will be seen that the differences of intensity experienced at different points along the scale, at equal distances from each other, are by no means constant, the maximum difference being 184 degrees, and the minimum 14. In short, on one part of the graduated strip produced by such an instrument the transition in chemical intensity indicated will be thirteen times that indicated on another and equal portion of the same strip. To my mind any great inequality of diminution in equal steps of a photometer strip is very undesirable, resulting, as it must do, in a constantly-varying quantity as the minimum of experimental error.

The pendulum photometer made use of by Dr. Roscoe in his photochemical researches some years ago also gave a strip on which equal lengths represented unequal diminutions of chemical intensity.



Preferring that the diminution of light on successive steps of the strip should be represented by a constant quantity, I have been induced to resort to a rotating disc, with a slit in it for exposure, as by varying the width of that slit any required gradation can be produced. If, for instance, we stretch a strip of sensitised paper on a circular board, and extending from its centre to its circumference, and then cover this board with a circular piece of cardboard or tin having a piece cut out, two of whose boundaries are radii of the circle, by causing this upper piece to be whirled round the sensitised paper will be exposed during the passage of the slit. This particular shape of slit, however, grows wider in just the same proportion as different portions of the radius travel faster, and the exposure is consequently uniform throughout the length of the sensitised paper, and no gradation ensues. The moment, however, that the lines bounding two of the slit's sides cease to be radii of the circle gradation of some sort at once results. If, for instance, the slit have parallel sides the further we get from the centre the shorter the exposure will be, as there is but the same amount of aperture to travel over the paper, and the rate of its motion is faster in the proportion of its distance from the centre. The nearer the internal end of the slit is to the centre the more violent the gradations will be, and the more severe the curve required for their equalisation. In computing the width of a slit it must be remembered that our figures deal not with lines at right angles to the radius, but with segments of circles whose cords are at such right angles. Suppose we have a slit whose segments are of equal length, and whose sides are consequently almost, but not quite, parallel, we shall find the gradations obtained by its rotations to be as follow:—

WHEN THE INNER END OF SLIT IS ONE GRADATION FROM CENTRE.

Commencement of Gradations No.	1	2	3	4	5	6	7	8	9	10	11
Exposure, in Vulgar Fractions...	$\frac{1}{1}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{11}$
Ditto in Decimals	1·000	·500	·333	·250	·200	·166	·143	·125	·111	·100	·091
Diminution compared with preceding	—	500	167	83	50	34	23	18	14	11	9

WHEN THE INNER END OF SLIT IS TWO GRADATIONS FROM CENTRE.

Commencement of Gradation No.	1	2	3	4	5	6	7	8	9
Exposure in Vulgar Fractions..	$\frac{1}{1}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{1}{4}$	$\frac{2}{9}$	$\frac{1}{5}$
Ditto in Decimals	1·000	·666	·500	·400	·333	·285	·250	·222	·200
Diminution compared with preceding	—	334	166	100	77	48	35	23	22

WHEN THE INNER END OF SLIT IS THREE GRADATIONS FROM CENTRE.

Commencement of Gradation No.	1	2	3	4	5	6	7	8	9
Exposure in Vulgar Fractions ..	$\frac{1}{1}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{3}{6}$	$\frac{3}{7}$	$\frac{3}{8}$	$\frac{3}{9}$	$\frac{3}{10}$	$\frac{3}{11}$
Ditto in Decimals	1·000	·750	·600	·500	·428	·375	·333	·300	·272
Diminution compared with preceding	—	250	150	100	72	53	42	33	28

From the above table it will be seen, as already mentioned, that the nearer the inner end of the slit is to the centre of the circle the more violent are the gradations. A slit with nine gradations, whose inner end is at the distance 1, has a maximum diminution of exposure in a single step of 500 and a minimum of 14; whilst a slit whose inner end is two gradations from the centre has a maximum of 334 and a minimum of 22, and one whose inner end is three steps from the centre has a maximum of 250 and a minimum of 28. In every instance, however, the inequality of the steps is glaring. If we determine what gradations we require, and compare them with the gradations in the above table given by a constant length of arc, a simple-proportion sum yields the length of arc required to obtain the desired gradations.

The following short table supplements the figures given in the preceding table in the desired respect:—

WHEN THE INNER END OF SLIT IS ONE GRADATION FROM CENTRE.

Commencement of Gradation No.	1	2	3	4	5	6	7	8	9
Required Gradation	1000	900	800	700	600	500	400	300	200
Length of Arc to get it	1	$1\frac{1}{3}$	$2\frac{1}{3}$	$2\frac{1}{3}$	3	3	$2\frac{1}{3}$	$2\frac{2}{3}$	$1\frac{1}{3}$

WHEN THE INNER END OF SLIT IS TWO GRADATIONS FROM CENTRE.

Commencement of Gradation No.	1	2	3	4	5	6	7	8	9
Required Gradation	1000	900	800	700	600	500	400	300	200
Length of Arc to get it	1	$1\frac{7}{10}$	$1\frac{13}{20}$	$1\frac{14}{20}$	$1\frac{18}{20}$	$1\frac{14}{20}$	$1\frac{13}{20}$	$1\frac{7}{10}$	1

WHEN THE INNER END OF SLIT IS THREE GRADATIONS FROM CENTRE.

Commencement of Gradation No.	1	2	3	4	5	6	7	8	9
Required Gradation	1000	900	800	700	600	500	400	300	200
Length of Arc to get it	1	$1\frac{2}{11}$	$1\frac{4}{11}$	$1\frac{6}{11}$	$1\frac{5}{11}$	$1\frac{4}{11}$	$1\frac{3}{11}$	1	$\frac{11}{12}$

It will be seen that the width of slit No. 1 is three times as great at the centre as at the ends, which, if the end width be an inch, as I prefer it when the gradations are inches, makes an unsightly slit of awkward proportions. No. 3 gives a sinuous curve instead of a regular one, whilst the curve of No. 2 is not only regular but so near to a circular curve as to be almost indistinguishable from it, even upon measurement. For these reasons I regard the curve of No. 2 as most desirable. Another contributor to this Journal will shortly have something to say on rotary photometers and on the results obtained therewith in photochemical researches.

D. W.

PHOTOGRAPHIC SOCIETIES.

Ever since I can remember photographers have been given to grumble at the deeds of the body which is supposed beyond all others to act as their representative. Never was a "medal award" announced without its being received with more or less clamour, and by strong assertions here and there of miserable jobbery. Probably enough this singular state of chronic dissatisfaction, and sometimes rather widely-spread feeling of disgust and contempt, is a thing to be to some degree expected. Disappointed human nature in the shape of aspiring exhibitors is, like a dog whose foot has been run over, not given to silence, and the noise made by it is, perhaps, enough to drown the judgment of more disinterested people. An undue attention is, *prima facie*, likely to be drawn to those who, being passed by, cry out.

But granting that, it can hardly be that, were the proceedings of our parent society based upon right principles and intelligible laws, such clamour would be so long continued, or the dissatisfaction so deep as it undeniably has been and now is. There must be something at work producing the feebleness of that society's influence over the profession—something which causes its proceedings to pass mostly unheeded, its exhibition to be virtually deserted by the best lights of the art, and its decrees and awards to be about as much looked up to as if they were those of a committee of savage negro chiefs on the White Nile. And I cannot help suspecting that, regarding these last signs of weakness at least, Mr. Sutton has pointed out the true origin of the futility when he says in effect that the substitution of taste or whim for scientific or practical fact is an utter absurdity in judging of the merits of any production. However well intended persons may be, the only outcome of such an absurdity possible is an opinion, not a judgment; and that, too, an opinion given by persons who at best are merely amateurs in matters of taste, whose weakness it often is, with the best intentions, to merely echo the voice of the interested touter. I am speaking here of what is an obvious truth to everyone who has thought at all upon such points.

It follows from this, however, that a photographic society, in order to be a leader and a help to all ranks of the profession, ought to be governed on principles and composed of men who would not fall into the mistake of substituting personal taste for practical utility or scientific fact. If societies as now existing in this country are not framed according to this standard, whose blame is it? These effects are traceable to a very easily-defined cause; but how came that cause to be there? Are all the sins of the profession to be laid upon the shoulders of a few amateur gentlemen who have assumed, or have been supposed to assume, the post of honorary leaders therein? The answer to these questions ought, if rightly given, to tell us where the road to reform lies, and to this aspect of the subject I would now turn.

And, first of all, let me say that I think the blame of the failure of photographic societies, old or young, lies primarily with those who neglect them. It is the habit of weak representative bodies to become cliquish; and if the photographic societies have been left to grow feeble they have, in developing that unlovely quality, merely followed an inevitable law. It is, in some respects, a disgrace to us that we are so far behind other countries—so far, above all, behind France in the quality and influence of our societies; but it is our blame that we are so. The first thing a man does when some proceeding of the dominant coterie of a society offends him is to resign, apparently with the view to make that coterie stronger; and then he stands outside and complains to the passers-by of the way in which things are going on. This is both futile and cowardly, and, if the profession were at all united and strong, ought to come to an end. Until it do the societies will be nothing but coteries, more or less. The true duty which lies upon members, as in some degree representing there the whole body of photographers, is to stick to their post and enlist others until the coteries give place to a well-defined *party* with a distinct and open policy. No society can really be representative which does not include men from all grades of the photographic profession, and not merely those who amuse themselves with the art or employ it in the researches of science. But the complaint has always been made that the old society was not representative, because it consisted of a few amateurs; and yet it has been abused as if it were in reality the parliament of photography.

To secure that a society shall be vigorous and healthy it is only necessary that it be large and vigorously administered. I venture to think that the old society might become this if photographers would rally round it and obtain a preponderance of active business men upon its managing committee. Trade jealousies would not be half so powerful then as they are now. They never could be well-balanced and kept in abeyance but by the abundant representation of trade interests in the governing body. In their absence the wire-pullers outside find it possible to influence the several kindly but uninterested gentlemen who have nothing to keep them awake, and doubtless often do so to a very pernicious degree. Besides, it is not so much a question of honesty or dishonesty, of wisdom or folly, as of business interest, practical capacity, and scientific training. Were the committees of our leading societies filled with men of practical aptitude, and were the French fashion followed of appointing sub-committees from amongst the members known to have a turn for business, to try every new thing and report thereon, a healthy life would soon be diffused through the whole fraternity. The aid which such institutions might thus give, both in encouraging the honest worker and discoverer and in knocking quacks on the head, is simply not to be calculated.

I repeat, then, that the blame, if our societies are not doing such a work, rests not so much with those who form them as with those who stand outside; and if it be meant by the profession that a society shall have other than local or class influence it would be much better to say so at once, and cease expecting the impossible from them and from blaming them for not producing it. Certainly it is small blame to a knot of gentlemen who live outside photographic interests, and are ignorant, very often from the impossibility of being otherwise, of photographic traditions or received standards of excellence, whose knowledge of technicalities may be of the smallest, if they err in their awards and ignore many things in their arrangements. Do not oust these gentlemen. Leave them but add the practical element, and see how the mixture will work. These practical photographers of high standing on a committee of hangers and judges of an exhibition, and chosen by ballot of the exhibitors, would make it almost impossible for charges of the kind so often flying about to find any established currency. Their own repute and the responsibilities of their representative position, as well as their vigilance for fair play on the mere ground of self-interest, would effectually tend to prevent any perversion of their power. At all events, the path of reform lies in augmentation, not in substitution, whether of societies or of men.

A. J. W.

PHOTOGRAPHING MICROSCOPIC OBJECTS.

[A communication to the Royal Microscopical Society.]

It has often struck me as a curious fact that the process of taking microscopic photographs has received so little attention from working anatomists. I think the solution of this enigma is to be found in the immense amount of apparatus which is supposed to be required. To look at Moitessier's book, or, worse still, at the paper by Dr. Berthold Benecke, in Max Schultze's *Archiv* (3 Bd. 1 Heft., 1867); to contemplate the paraphernalia there set forth—the condensers, achromatic and non-achromatic, the plate of ground glass, and the long array of apparatus—is enough to deter any one whose time is fully occupied from attempting the art. Other writers seem to require the whole force of a government establishment, a large darkened room, and a heliostat; they speak of employing a practical photographer one or two evenings a month to help them to reproduce all the more interesting of the month's observations, forgetting apparently that it might be necessary to copy fresh objects which would not keep until the photographer happened to be disengaged. I have found it possible to dispense with most of this apparatus, and to do the work with a microscope, an ordinary camera, and a deal or mahogany board.

In the succeeding remarks I do not think that I have anything absolutely new to give; yet there are many little processes and, if I may use the term, "wrinkles," which would have saved me a world of trouble if I had been acquainted with them formerly, and which I hope will be of corresponding service to others who may be desirous of acquiring skill in the art. They are not to be found in books, and I have had to learn them by sheer experience.

My apparatus is very simple. It consists of a mahogany board, four feet in length and ten inches in width, which is made to double up in the centre for convenience in travelling; there is a slit running longitudinally from near one end to within three inches of the other; at the extremity three screws are arranged so as to fix down the microscope square to the board. Taking an ordinary bellows camera, I have had the frame which carries the lens separated from that which carries the focussing-glass and fitted to a foot which can be fastened at any part of the board by means of a screw passing through the slit. The focussing-frame has been treated in the same manner. The two parts were then connected by a treble fold of black calico long enough to reach from one end of the board to the other; this calico bag is kept apart by two rows of rings, which run along a couple of brass rods attached one to each upper angle of the focussing-frame. The whole is so arranged that the picture from the object under the microscope falls on the centre of the focussing-glass, which is made by pouring a very thin solution of starch over a piece of patent plate, and allowing it to dry spontaneously in a horizontal position. When the apparatus is required for use it is placed on a table, the microscope is fixed in its proper position; the body being arranged horizontally is pushed through the opening for the lens in the front frame, and is surrounded by black velvet, so as to make the aperture impervious to light. The focussing-frame is fixed at any point on the board according to the magnifying power required; the fine adjustment is moved by means of a rod attached to the side of the board, the further extremity of which carries a small grooved wheel which moves the fine adjustment by means of an elastic band. The only other piece of apparatus required is a small glass cell filled with a solution of alum, which cuts off the heat rays of the sun without in the least diminishing the light. The eyepiece is always taken away from the microscope, as its presence diminishes the light and the definition, the increase in size of the image being obtained by a method of enlargement to be mentioned presently. With the above arrangement the one-eighth object-glass gives a magnifying power of 350 diameters. The advantage of employing itself instead of having the object-glass fixed to a special frame, as some recommend, is obvious; for, if anything occur in one's researches a copy of which it would be advantageous to keep, it can be photographed at once (provided the sun shines) with less difficulty than by using the camera lucida.

There is a good deal of trouble attendant on getting the focus properly; with the one-fifth or one-eighth and higher powers the image looks scarcely more defined on the focussing glass when it is in focus than when it is just out of it. A magnifying glass must be used; a watch-maker's lens, or an ordinary doublet does very well. When the object-glass is just within focus there is to be observed round the external edge of the subject to be photographed a border of white light; as the object-glass is being moved away this border diminishes in width, and just as it gets out of focus the bright border suddenly changes to a dark one. The moment must be seized when this border is on the point of disappearing and before the dark edge is seen; at this point the object is exactly in focus. To get the best effect the adjustment for covered objects must be screwed down, and the thinnest possible covering glass (0·005 inch and less in thickness) must be employed. If this be not done concentric lines, called interference lines, are apt to surround the subject, spoiling the effect and damaging the negative.

I have found that no other light answers so well as sunlight for microscopic photographs. Artificial light is a delusion, with perhaps the exception of the electric light; but the trouble and expense of this precludes its employment in a private house, for at least fifty cells would be required. Magnesium ribbon gives an impression, but I have always found it impossible to get a good focus; perhaps if it could be arranged so as to give a steadier light it might answer. Dr. Woodward appears to have succeeded with it. As before mentioned, condensers, ground glass, &c., are unnecessary—at least for the one-eighth inch and lower powers—the ordinary concave mirror attached to every microscope being all that is requisite; but even with the lowest power this mirror should be used, as with the flat one the image of the spots of dust and other extraneous objects comes out with painful distinctness. If the object to be copied be an ordinary microscopic preparation no especial precautions are necessary; but in cases where fresh tissue examined in fluid is the subject it is better to paint the edge of the thin glass cover temporarily with gold size to prevent evaporation. This is easily rubbed off after use. If the subject be not very pervious to light a good plan is to paint the surface of the slide round it with Indian ink—in fact, to stop out all light except that which passes through the object.

Hitherto I have spoken only of taking the negative; I now come to the consideration of the best way of printing. It is generally remarked that the former may have all the finest definition that can be desired, but that in the latter the greater part of this distinctness is lost. Now, by the process which I am about to describe prints can be obtained absolutely equal in point of definition with the negatives, and three or four times their size. For instance: if a negative has been taken by the one-eighth objective, doubling it will show all that is seen (being in focus) by that glass with the A eyepiece; trebling its size will show the same as with B eyepiece, and so on; but, if the negative has been taken by the one and a-half inch objective, magnifying it six times will not make it show what is to be seen by the two-thirds objective, so that by this process one cannot substitute a lower for a higher objective, but simply compensate for the absence of the different eyepieces in taking the negative. The method consists simply in printing on a collodion film instead of on paper. Moitessier is the only writer on microscopic photography, that I am aware of, who mentions it. The same apparatus is used for printing in this manner as for the preceding process. The microscope being removed, a short-focus photographic lens is screwed into its place; the front frame is then fixed at such a distance from the focussing-frame as to give a magnifying power of say three diameters. Now another piece of apparatus comes into use; this is a wooden frame to carry the negative. It works in a groove in a block of wood of such a size as to make the central point of the negative coincide with the central point of the lens; the frame for the negative is kept in place by a spring, and the block can be screwed down at any point of the slit before mentioned. The space between the negative and the front of the camera should be covered with a focussing-cloth, so that no light should enter the lens except through the negative. To prevent the print being reversed it is necessary to take the impression through the back of the plate. The apparatus being properly arranged the whole is turned at an angle towards the sky, so as to be clear of trees or other obstructions near the horizon. Direct sunlight is not required, and indeed is detrimental to this part of the process, although Moitessier recommends a complicated system of condensers; but these are superfluous when the enlargement required is so small.

Several precautions are necessary in preparing the plate. In the first place, the collodion must not be too thick; for, if so, it has two disadvantages—the whites of the image are sure to have a yellowish tinge, and the film is apt to slip off either in the nitrate bath or during the subsequent operations, so that it is better to add a small quantity of ether (a drachm to an ounce). In the next place, previously to pouring on the collodion, the plate must be rubbed over by means of a bit of rag, with wax dissolved in ether. Care must be taken not to apply too much, for in that case it forms reticulated markings on the film; nor too little, or else the collodion will not come off the glass in the succeeding parts of the operation. The glass plate must be coated as thickly as possible with the thinned collodion, as it will then come off more easily. Having taken the image of the negative and developed it in the usual manner (I find the gelatino-iron developer answers extremely well for this process), the next step is the toning. This is best accomplished by means of chloride of gold, which gives a good black; platinum is, I think, not quite so good. Other substances may be used, but they do not answer so well. Uranium gives an ugly reddish-brown colour; bichloride of mercury, with the subsequent addition of very weak solution of hyposulphite of soda (a grain to an ounce of water), gives a good colour, but is excessively troublesome to use, as the mercury makes the film very rotten. Gold, although expensive, is the best; a grain to a drachm of water is poured over the collodion positive until the black colour is seen through the back of the plate when held over a dark material such as velvet. It does not do to hold it up to the light, for then the print may look toned when it is not so. When the above quantity will not tone any longer some more gold must be added; but the remainder need not be thrown away, as it keeps well and will do again another time. The effect of this process may be varied according to the subject. If the plate be exposed only just long enough to get an image, so that a prolonged development is required, the resulting print will be of a fine black colour; but if a very long exposure be given, and the development correspondingly shortened, the print is softer and has the colour of a lead-pencil drawing, which is better for microscopic objects.

The positive having been washed and toned, the next step is to apply to its surface a piece of paper previously coated with a layer of gelatine, about twenty-five grains of gelatine to one ounce of water, to which about five drops of gelatine and a trace of chrome-alum has been added. The best way to effect this transference of the film is to lay the plate in a dish of clean water, not necessarily distilled; a piece of the prepared paper is soaked in the water until thoroughly wet, and then applied to the face of the positive beneath the surface. The latter is then lifted out of the water with the paper on it; this prevents all air-bubbles getting between the two, but if any should chance to find an entrance they must be gently pressed out. The plate having been allowed to get dry is again soaked in water for a few hours, when the paper may be lifted off with the collodion film attached. Very often the film will come off without previous drying, but it is safer to do so. If it come off when it is dry, as it sometimes will, we have a print with a highly-polished surface, which is no doubt very pretty, but not so good in an artistic point of view. If the above directions should be faithfully followed a print giving all the details of the original negative, and magnified three diameters, will be the result. I will conclude this paper with an account of a mode of transferring negatives whereby they can be carried about by dozens as easily as so many sheets of tissue paper, and by which means the glass plates can be used over and over again for an indefinite length of time, until they get so much scratched as to be worthless. They can be cleaned between each time of being used by a strong solution of washing-soda; they should be allowed to soak for at least a week.

The fluid which forms the tissue, which, I believe, was first recommended by Mr. Walter Woodbury, is made as follows:—Twelve grains of pyroxyline is dissolved in each ounce of a mixture of equal parts of ether and alcohol, and twenty-five drops of castor oil subsequently added. The proportions must be properly arranged within certain limits. If too much castor oil be added the resulting film will be sticky and soft; if too little, it will easily break. To use this fluid it is necessary to prepare the negative beforehand, by pouring over it, after it has been sufficiently washed, a very weak solution of gum—one part of ordinary office gum to five or six parts of water; this must be done twice. If too strong a solution be applied the film will crack in all directions; if not enough, the image will be dissolved. When the negative is dry it is carefully placed in a horizontal position by means of a levelling-stand, and the liquid poured over it; this must be done with great circumspection, otherwise air-bubbles are apt to form in the tissue. It is best to use a long-necked bottle, and to hold the mouth close to the negative, so that none of it shall drop out but flow gradually. If a tendency to air-bubbles be shown, the solution had better be thinned with ether; a very small quantity of Canada balsam added to it diminishes the tendency to this defect, but causes reticulations in the film, which, however, do not show in the print. At first the film becomes of an opaque white colour, but it clears after a time and becomes quite transparent. The plate is then put into water, and after a few hours the tissue will come off easily, bringing the negative with it. It is not necessary in this part of the process to rub the plate with wax previously to taking the negative. The convenience of this tissue beyond the facility of carriage is that if one have two or three negatives of different examples—of the same kind of cells, for instance—they can be printed together by simply cutting them out of each and sticking them on to a sheet of the tissue by means of gum, when a print of the whole can be taken, and if the negatives are of different densities the weaker ones can be covered over for a part of the time of exposure. It is often necessary to paint out the background of a negative for this purpose; nothing is better than Bates's black varnish. This works very well with turpentine, and should be applied under a simple microscope of considerable power, or by the compound microscope with the erector, so as to get the edge smooth.

I hope in the preceding remarks that I have done something towards simplifying the process under consideration—a process which, although I imagine not destined to supersede the pencil, yet has such great advantage that it ought to be encouraged. Its advantages may be summed up in one word of great importance to scientific men, who are or ought to be searchers after truth. That one word is "accuracy;" whatever is in focus on the slide will reappear in the negative. On the other hand, its disadvantages are twofold—one which appears insuperable is that it only shows objects in one plane; the other is that sunshine is necessary. This, in a climate like ours, is very serious, but it may be overcome by patience and waiting for a fine day; nevertheless, it is sufficiently provoking to have one's work interrupted by a sudden over-clouding of the sky. Whoever will invent a steady light of great actinic power, which shall be inexpensive, not requiring quarts of acid or a small steam-engine, will confer a benefit on the science of anatomy.

Alfred Sanders, M.R.C.S., F.L.S.

PHOTOGRAPHIC ILLUSTRATIONS OF THE ERUPTION OF VESUVIUS OF APRIL 1872, COLLECTED AND PREPARED BY J. M. BLACK ESQ., J. P.: EXPLANATORY REMARKS.*

The next picture of the series shows the great lava waste just above the overwhelmed villages of Massa di Somma and Sebastiano, as looked at from the Fosso Vetrana, with the stream just gliding over an inclination to the left, which slopes from above the Atrio del Cavallo directly down to the destroyed villages. Nine other pictures represent different parts of the overwhelmed villages as they appeared ten days after the beginning of the eruption. In two the north and south borders of the stream are delineated, thirty feet high, and bursting through the lower stories of the burnt and shattered houses. In another view the lava is seen crossing and closing the vista of a street, like a huge railway embankment thrown thirty feet high across the main line of thoroughfare. In all this part of the series the peculiar weird combination of destructive forces by which the volcano operates is admirably expressed. In one place the lava burns to a blackened cinder; in another it dislocates with a resistless thrust; and in another buries up whatever it encounters under tons of half-plastic adamant, or under piles of loose ashes.

The cindery formation of the crust of the lava, due to imperfect fusion and to irregular cooling of a molten mass, is very intelligibly rendered. In one picture is shown the vast width of the main lava-stream overwhelming the face of the country towards the Bay of Naples, after the fiery flood had swept over Sebastiano.

In order that the several incidents of these pictures of volcanic destruction and devastation may be properly apprehended, it may be as well briefly to state what occurs when a stream of molten lava breaks out from one of the high slopes of Vesuvius at the time of an eruption. First, the lava runs down the steep side of the cone, with a rapid descent, for 800 or 1,000 feet, but not with the noise and splash that attend a sudden fall of water. It glides down on its fiery path with a quiet, stealthy, serpent-like movement, on account of its thick pasty consistence, lapping round all objects that it encounters by the way. On reaching the gentler declivities around the base of the cone it slackens its speed, soon moving not faster than a man can easily walk, and even at a less rate than that towards the side, where a solidifying crust first begins to form. It soon melts out for itself a regular channel in the old ashes and lava, with banks rising some feet above the surface of the burning stream. As it gets further and further away from its source it spreads wider and wider, and moves more and more sluggishly, until at length it stops altogether in front, forming a massive rampart, many tons in weight, with firm, hardened sides, due to the cooling crust, but with streaks of liquid fire still seen shining through here and there. The rampart grows bigger and thicker, until at last with a tremendous crash it rolls over, pushed out of the way by the pressure of the stream gathering behind; and then a new rampart begins to form; and this process is repeated again and again, until the *vis à tergo* of the flowing lava has been exhausted. From the influence of this process, and from the subsequent operation of air, the beds of old lava assume the appearance which has been well compared to that of a suddenly-petrified sea, with waves twelve or fifteen feet high changed into stone, but with their sloping faces encumbered with loose clinkers, that break away and roll down into the hollows of the undulations at the slightest touch. All the old lava lying between the Observatory and the base of the cone of Vesuvius is of this broken, billowy, clinker-encumbered character. Four photographs of the series are given to illustrate this peculiarity; and they do so very completely and beautifully. They were taken from the old lava of the eruption of 1858 below the Hermitage Hill, and very adequately represent the contorted and ropy structure of the rock. One of this series also shows the position of the Observatory in relation to these lava-deposits after the eruption of 1858.

* Concluded from page 43.

One of the photographs represents the appearance of the eruptive fissure of 1861, on the south-west side of the mountain, near Torre del Greco. The fissure was 2,000 yards long; and in this eruption there were eleven craterlets vomiting ashes, but only one emitted any lava, and that in small quantities.

Three of the photographs give the form and appearance of the terminal crater on the summit of the cone ten days after the commencement of the eruption of 1872, and when all eruptive action had ceased. The first of these pictures of the great crater shows the aspect of the cone as it appeared from a mound of ashes situated in the fissure opened out on the Atrio del Cavallo. Several small fumeroles still emitted sulphurous-acid and hydrochloric-acid vapours on this mound; and its surface was incrusted with chloride of iron. In this photograph the cliffs of Monte Somma are seen to the left; and in the centre is shown the great rent extending through one side of the cone in a north and south direction, from the summit to its base, and some distance into the Atrio del Cavallo in front. Another and a larger photograph shows the interior of the crater, with the inner view of the same great rent. Bold masses of projecting rocks are seen descending into the abyss. The rounded and peaked eminences on the further rim of the crater were both active craterlets before the eruption. The ragged dark mass of lava on the right was coated brilliantly with sulphur and chlorides of iron and sodium. The front rim is formed of three distinct terraces; and upon the slope of one of these, inclined at an angle of about 30°, rests a large volcanic bomb. The third view of the crater also represents its interior, and shows the appearance of two curious rocky projections which advanced towards each other from either side, like partition-walls. These joined together about eighty feet further down and formed an arch below, by means of which the otherwise divided halves of the crater communicated. The walls of the crater here seemed to be almost perpendicular; but the eye could not make out the form of objects below this distinctly, on account of the prevalence of thick vapour. A small cone, however, could be discerned near the bottom, which seemed to be about thirty feet high; and the entire depth of the crater, from the upper rim to this cone, was approximately estimated at 650 feet.

Mr. Black states, in regard to the method by which his own photographs were made, that some of the negatives were prepared according to Mr. M. Carey Lea's formula for the collodio-bromide process, but that he was unfortunately compelled to use brackish water and to submit to other unfavourable circumstances during their preparation. He wishes it also to be understood that the Vesuvian views were taken in an atmosphere charged with gases adverse to the sensitiveness and integrity of the plates; and deems it a marvel that the views on the cone were secured in even an imperfect form, as an almost suffocating atmosphere invested the place. The smaller view of the crater is somewhat obscure from this cause. The greater distinctness of the larger view was mainly due to a more favourable direction of the wind at the time when it was taken.

R. J. Mann, M.D.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.*

A meeting of this Society was held on Thursday, the 25th December last,—the chair being occupied by the President.

The Secretary expressed, at the opening of the sitting, in the name of the Society, the regret which was felt for the loss of M. Marion, whose name was universally known in connection with photography. Although full of years, and weighed down with sickness, M. Marion's zeal was conspicuous to the last, and to that and his other good qualities the Secretary paid a very high tribute. His services in developing the carbon process were known the world over, and the stimulus which his exertions had given to permanent printing processes in France led him (the Secretary) to hope that the day was at hand when the "new ways" would be entered upon by the profession.

The SECRETARY then brought under the notice of the meeting M. de Constant Delessert's *brochure* called *Dry Collodion Brought Within Everybody's Reach by a New and Simple Process*, characterising it as one of much interest. The new feature in it consisted in gallic albumen being used as a preserver and stimulus to sensitiveness. Previously M. de Constant had used coffee for that purpose, but had found that the resulting negatives were endowed with peculiar hardness, which defect he was able to remedy only by the addition of a certain quantity of gum. Hence he had turned to dilute albumen tempered with gallic acid, already well known as a preservative. Some burnt sugar was also added, to preserve the tints. He recommended the process to the members, and

The CHAIRMAN thanked M. de Constant for his interesting communication.

The commission charged with the duty of examining the communication of Mr. Thomas Sutton was then called upon to present its report.

M. JERRIS stated that he had conscientiously tried the various samples remitted to him by the Secretary, and had communicated to that gentleman the results of these trials. He regretted that he was unable to come to any formal conclusion, but the result of his experiments so far were of a kind to lead him to hope for entire success. Although furnished with complete instructions by Mr. Sutton, he was afraid that the newness of the method to him, and his want of skill as a worker with collodio-bromide, prevented him from being able to take complete advantage of this plan for preserving the sensitiveness of humid plates throughout an entire day. He had, however, ascertained the great sensitiveness of the plates, and further experiments might enable him to come to definite conclusions on other points.

The SECRETARY thereupon took the opportunity of distinctly pointing out the essentially-useful character of Mr. Sutton's process, which gave the means of keeping plates in a high degree of sensitiveness during an entire day, and thus an advantage was in two respects obtained over the dry processes, inasmuch as the resulting negative had not the hardness, nor had the plates the slowness, of action of the dry. Some further remarks in the same strain followed, and then

The CHAIRMAN thanked Mr. Sutton in the name of the Society, and offered him his felicitations on his communication and his remarkable researches.

M. MELCHION communicated, through the Secretary, the results of his efforts to accelerate the reception of the impression in the camera by combining the simultaneous employment of insulation by means of a ground glass before exposure and immersion in a twelve-per-cent. silver bath before development, and by this means succeeded in reducing the exposure by about one-half. M. Melchion had worked in M. Vidal's presence with this result. A collodionised plate was exposed in the dark chamber to insulation for two seconds by means of a ground glass acting as "obturator," then exposed upon the subject for eight seconds, after which it was immersed for thirty seconds in the silver bath, and developed with iron. The result was a perfect negative of the requisite density. Another plate was exposed for fifteen seconds in the ordinary way, and gave an almost identical result. A third was exposed for eight seconds, and gave a very feeble image.

The CHAIRMAN thanked M. Melchion for the notes he had made, and for his evident desire to share with his brethren the results of his researches.

M. VIDAL exhibited sundry polychromes, and spoke as to the progress which he was making in the perfecting of his process. Since their last meeting it had been sensibly modified, though still essentially the same thing. In lieu of gelatinising the respective monochromes, he coated the final mount or support with a feeble layer of gelatine, and then each of the monochromes which had been superimposed. In order to bring these into perfect juxtaposition all that was necessary was to bring the monochromes together in the desired order—an easy thing, thanks to the *papier vegetal*. The picture is then laid on a glass, which is placed flat, the back of it gummed over, the mount placed on it, and there is nothing further needful but to leave it to dry spontaneously. One must be careful not to press it between blotting-paper, which would expose it to an unequal distention of the layers, and probably derange the exactness of the juxtaposition. In order to keep an extreme fineness of surface, and to prevent any deadening, the pictures ought to be allowed to dry spontaneously. With regard to M. Laroche's plan for producing tinted photographs by means of lithography, he (M. Vidal) ventured to think that it would not do. It was a method of colouring, he said, good only for producing effects which lithographers term *à plats*. Such pictures might offer a certain charm, but they could never pretend to copy nature with any degree of closeness; whereas by the employment of the process of polychromy completely in carbon one can reach the utmost exactness of transcription of no matter what subject. [This may be so, but we would ask M. Vidal if his process be not a superimposition of tints by the hand of precisely the same kind as the superimposition of the lithographer by means of his stone. The one can reach exactness of juxtaposition just as closely as the other, and the one has just the same gauge for his tints as the other. There is no difference essentially. Both have only their eyes to determine the shade by, and their judgment to settle the order in which they will come; and for rapidity of execution lithography as yet beats the process of M. Vidal entirely.]

M. VIDAL, in showing the Society one of his pictures, took the opportunity to remark that it showed only flat hues and a general greyness. Hence he inferred that it was important to model or "shade," not by the greys only, but by the colours themselves, in order to get the finest effects. Among the proofs exhibited was one on opal glass, which showed how well his process was adapted for glass transparencies.

This being all the business, the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

AT a meeting of this Society, held November 17, 1873, Dr. Vogel occupied the chair, and, after a new member had been received, presented to the meeting some Woodburytypes, by Bruckmann, of Munich; amongst which were two fine views of gothic buildings, and a scene from *Hermann and Dorothea*, which had a wonderful closeness of resemblance to silver pictures.

Herr LE COQ raised the question whether, seeing the great increase of expense the Society had now to bear for rent, the subscription ought not to be raised, and suggested that such should addition be confined to members in the city.

Herr HARNECKER, as one of the members outside this limit, said that he felt sure no such restriction ought to be made, for that every member, no matter where he lived, would be glad to help and bear his part in the maintenance of so enterprising a body.

Herr PRÜMM then delivered his report upon Stock's "collodiometer." He said that the experiments he had made yielded the result that it was intrinsically impossible by its means to test ready-made collodion, the mode of making which was unknown, because the proportions of ether, alcohol, and water which it contained had to be taken for granted, it being absolutely impossible by merely extraneous means to determine them; yet upon the proper gauging of that point the verdict of the instrument largely depended. Hence, iodised collodion could not thus be tested, because the salts contained in it influenced the register. The sole use of the instrument, so far as he could judge, was that with home-made collodion it might be useful for determining, in a rough but workable sort of way, the proportions of ether and alcohol. Upon that point Herr Stock himself remarked that if a collodion were prepared in the proper proportions, in which each hundred parts contained ninety-seven and a-half in equal portions of alcohol and ether and two and-a-half parts of gun-cotton, and if the collodiometer, when inserted in this at a temperature of about 60° Fahr., stood at two and three-quarters or more, they might understand by this that an excess of ether beyond the requirements for solution was needed to give a good iodised collodion. The pyroxyline had in that case been prepared at a low temperature and with strong acid. If, on the other hand, the collodiometer fell below the actual proportions contained in the collodion, it was necessary to add an excess of alcohol. If more ether were added in this case the resulting film would be brittle, drying suddenly, and apt to peel off at the edges of the glass. This was often also explainable of the greater or less ease in the flow of the collodion, which was often through bottling altered for the better or the worse.

Dr. FRIEDLANDER considered it, as a rule, impossible by means of a simple aerometer to measure the quantitative proportions of so complex a substance as collodion with any approach to certainty.

Herr Biequer presented a sample of varnish to the Society, which gave a very fine, hard surface. This gave rise to some discussion on the unfortunate frequency with which varnish films split up.

Herr SCHAARWACHTER said that he did not altogether blame the varnish, but said that the glass had something to do with it.

Herr REICHARD thought it was undoubtedly the fault of the varnish, and recommended a sort that never failed him—*Beyrichschen lack*.

Herr SCHÜLER recommended a plan, which he had first brought under notice more than a year ago, of coating the plate with yellow dextrine before varnishing, as the best prevention of cracking.

The SECRETARY said that several circumstances combined to promote or to prevent the cracking of varnish. He had plates that had cracked with all sorts of varnish, and even when dextrine had been employed; and, above all things, he advised that the plates should never be subjected to extreme variations of temperature or to damp.

Herr TALBOT exhibited the new American magic lantern, the sciopticon, and explained its characteristics, with which our readers have already been made familiar; and subsequently the President passed a series of views through it and recommended it to the members.

The CHAIRMAN, with the help of apparatus, demonstrated his new researches into the sensitiveness of bromide of silver to the yellow and red rays. His remarks will be found at some length in our number for January 16. Meanwhile it may be stated that several members esteemed them of great importance.

Herr PRÜMM said that practically Herr Vogel's discovery was of much importance; for it was often the photographer's lot to have to deal with cantankerous colours, such as yellow and red, not only in reproducing pictures in oil, but in ordinary portrait work, and which produced no little disturbance.

The Chairman exhibited an English glass-cutting instrument, which consisted not of the old-fashioned diamond, but of a small sharp-edged wheel of hard steel. This did actually cut the glass, only a certain habitude in its use and also considerable pressure were requisite.

This closed the business of the meeting, which was then adjourned.

Correspondence.

M. VIDAL'S NEW SPECIMENS OF PHOTOPOLYCHROMY.—M. MELCHION'S METHOD OF REDUCING EXPOSURES IN THE CAMERA.

THE French Photographic Society held its monthly meeting on the 9th instant, when, we are told, the honours of the *séance* were reserved for MM. Vidal and Melchion.

The former gentleman had sent for exhibition three remarkably fine specimens of his new process of producing photographs in colours, which attracted much attention. M. Lacan speaks of them in the highest terms of praise. One was a copy of a charming painting by Chaplin, and was characterised by all the beauty of a clever water-colour drawing executed by the hand of a master; no shade was falsified, nor any of the detail lost. The other two subjects were portraits from life, one of which was intended to be viewed by reflected, and the other by transmitted, light. The former was from the same negative as that which has supplied the two illustrations in Dr. Van Monckhoven's last edition of his treatise on photography, only the fair sitter has now been invested with a rose-coloured silk robe, which is said to harmonise beautifully with the delicate tints of her neck and arms. The other portrait—also that of a beautiful woman—is printed in colours upon opal glass, and intended to be viewed as a transparency. It is a miniature of exquisite delicacy, and gives an excellent idea of the suitability of this process for producing coloured proofs for the stereoscope.

M. Vidal has promised to send me duplicates of these specimens, and I am in daily expectation of their arrival. I shall then immediately forward them to our Editors to exhibit at the office of this Journal and report upon if they think fit.

The interest which attaches to any rational method of colouring photographs in such a way as not to hide the details is very great, and the introduction of colour according to a *right* principle of operation will be a vast improvement upon the present method of treatment, which consists in painting the photograph so as more or less to hide its details, and thereby lower its special value as a truthful representation. What we have to avoid is a mongrel production, which is neither photography nor art, and which cannot, therefore, be acceptable to any but a vulgar and uneducated taste. M. Vidal's process seems to be right in principle; but how far it may prove to be a commercial success, or a method suitable for general adoption, no one can at present foresee. I have already hinted at another method which yields exquisite results, which is equally right in principle, and respecting which I hope to be able to give full details shortly. It is a far simpler method than that of M. Vidal, but each proof has to be separately coloured by hand.

The other subject which seems to have greatly interested the meeting was a method of reducing the exposure in the camera which has been for some time practised by M. Melchion, of Marseilles.

The method consists simply in placing a piece of opal or ground glass before the lens for a second or two, before allowing the rays from the sitter to be transmitted through it. Thus a little diffused light is allowed to fall upon the plate, which, it is supposed, starts the action of the actinic rays before the actual exposure commences, thereby reducing the time of exposure. Care must be taken, however, to avoid fogging the plate.

Twenty years ago M. Blanquart-Evrard found that lining the camera with white paper had a similar effect; and we have had of late years various suggestions, all based apparently upon the same principle, for reducing the exposure by means of diffused light transmitted through coloured glasses which are, more or less, non-actinic. Dr. Vogel has, I think, given a satisfactory explanation of how all these methods act, but it seems to me that in most of our dark rooms there is sufficient actinic light present to render such complications unnecessary; if not, the quantity can be very readily increased. The acid in our films and in our developer, no doubt, destroys a part of the latent image, and this part can be readily replaced by a slight exposure to general diffused light instead of by lengthening the exposure to the sitter. The only question is how to do in the simplest possible way what is required. If we can spare the sitter a longer exposure so much the better for the expression. There is *something* in all this which we must not be inclined to "pooh-pooh" too hastily, particularly when good practical men find their results in accordance with theory. The principle seems to consist in giving the acid something to destroy which is not a part of the true latent image, and instead of it.

At the same meeting Mr. Stillman made some observations on the subject of the emulsion process; and a new embossing-press was exhibited by MM. Pietkieviez and Wagner.

It appears now that, in certain schools in Paris, young ladies are taught to retouch photographs, as a branch of education. What a blessing such young ladies may be by-and-by to their husbands or brothers, if the latter should elect to become amateur or professional photographers!

Redon, January 23, 1874. THOMAS SUTTON, B.A.

FLUORINE AS AN ACCELERATOR.

To the EDITORS.

GENTLEMEN,—With reference to fluorine as an accelerator, I beg to say that in the autumn of 1850 I published the first translation of Le Gray's work on photography, in which he says:—"I am now making use of the following processes on glass: fluoride of potassium or sodium is dissolved in alcohol of 40°, mixed with sulphuric ether, and then saturated with collodion," &c.

I regret that I cannot give you a copy of my 1850 pamphlet, having only a single copy left, but send for your acceptance one of my third edition, published about 1856.—I am, yours, &c.,

Holborn Viaduct, January 27, 1874. RICHARD WILLATS.

[We have to thank Mr. Willats for the gift of the pamphlet referred to, and for affording us, since the foregoing letter was written, an opportunity of examining the original edition of the translation of Le Gray's *Practical Treatise on Photography upon Paper and Glass*. The extract given above entirely decides the question as to the first use of the fluorides in connection with collodion. As we think it will prove interesting to many readers we shall give the entire Appendix to M. Le Gray's work, this Appendix having reference to the application of collodion to photography, and being the first published announcement connected with it:—"I have just discovered a process upon glass, by hydrofluoric ether, the fluoride of potassium and soda dissolved in alcohol 40°, mixed with sulphuric ether, and afterwards saturated with collodion. I afterwards react with aceto-nitrate of silver, and thus obtain proofs in the camera in five seconds in shade. I develope the image by a very weak solution of sulphate of iron, and fix with hyposulphite of soda. I hope by this process to arrive at great rapidity. Ammonia and bromide of potassium give great variations of promptitude. As soon as my experiments are complete I will publish the result in an Appendix. This application upon glass is very easy. The same agents employed with albumen and dextrine give also excellent results, and very quick. I have also experimented with a mucilage produced by a fucus—a kind of seaweed—which promises future success. I hope by some of these means to succeed in taking portraits in three or four seconds."—EDS.]

LIFE-SIZE HEADS.

To the EDITORS.

GENTLEMEN,—I am afraid I did not express myself quite clearly in my last communication respecting life-size heads. If you will refer to Mr. Crawshay's conditions you will find he says:—"The head not more than eight inches nor less than seven and a-half inches from the top of the forehead to the bottom of the chin." The construction I put upon this paragraph is that he intends the measurement to be taken from the roots of the hair on the forehead to the bottom of the chin, which I maintain will in most cases give a head exceeding life size, as the exact spot where the hair commences on the forehead varies greatly in different people. My own face, for instance, from the roots of the hair to the bottom of the chin measures seven inches, and the actual skull nine inches. Had Mr. Crawshay said "face" instead of "head" his meaning would have been perfectly clear. I think this matter ought to be set right before the next competition, otherwise it may cause unpleasant mistakes.

No one can deny that the enlargements now made by the plate or negative process are far in advance of anything yet produced in that line. I find, however, that there is a tendency with certain persons to claim these superior results as being due to some special method of producing the transparency, which, of course, is their secret.

There is really no secret in the matter. The process used is the oldest and simplest known for enlarging; the greatly superior results are due, in a great measure, to the wonderfully-improved character of the negatives taken at the present day over those taken even a few years since. Those formerly taken were dense, over-exposed, and over-intensified things—quite unfit for enlarging. In place of these we now have beautifully soft, round, well-modelled pictures, artistically posed and lighted; these qualities, combined with skilful manipulation and judicious retouching, produce a negative from which almost perfect enlagements can be obtained.

Formerly the great trade in enlargements was done by the cheap photographers, chiefly through the medium of portrait clubs, where the money was paid by instalments. Their customers consisted of a class of persons—no doubt very worthy and respectable people in their way, but of very ordinary and commonplace appearance—the negatives of whom, under the combined influence of bad lighting, bad posing, and bad manipulation (intense sharpness seeming to be the only good quality aimed at), produced enlargements of a hideous, not to say repulsive, appearance, which required a considerable amount of working up in the lampblack and whitewash style to make them at all acceptable to the not over-fastidious or critical sitter. I think you will agree with me that the finest and best enlarging would have been thrown away on such subjects; and it is therefore no wonder that the plate process languished and the developement process flourished, it being more suitable for working up and also much cheaper than the other.

Now the case is very different. Enlargements are taken up by the higher-class photographers, and patronised by a far superior order of sitters. It stands to reason that a photograph taken by a clever artist-photographer of a lady or gentleman shall produce a better enlargement than one of a servant or mechanic in his or her best clothes taken by a "duffer."

I think I have said enough to show that the greatly-improved results in enlarging are due not so much to any new discovery in the process itself, but are really owing to a superior quality of negative and sitter. —I am, yours, &c., PLANO-CONVEX.

January 24, 1874.

"HEADS AND FACES."

To the EDITORS.

GENTLEMEN,—In reading over the article on *Heads and Faces*, in last week's Journal, the writer seems to believe that Mr. Crawshay's standard, so far from exceeding, does not come up to, the natural size. In turning to Mr. Crawshay's rules I find he says that the head is not to be more than eight inches nor less than seven and a-half inches; then distinctly states that the measurement is to be made from the top of the forehead to the bottom of the chin, this measurement being not that of the head but of the face. I must say that in my opinion it is much over the standard size of the head of a lady. I have measured many and taken the measurement of several before writing this, and find than they run from six and a-half to seven inches. My own face is seven and three-quarter inches.

The writer of the article also makes mention that a member of the South London Photographic Society is reported to have said that "every artist" knew that the proportion of the head was one-tenth of the entire figure. This is an error, for it is well known to all who study the figure that the standard proportion is, as Mr. Aldridge stated, ten *faces*, not ten heads, the figure being divided into ten faces—that is, from the crown of the head to the sole of the foot.

Still, my opinion is that this maxim for dividing the figure is more fit for sculptors than painters. Painters have occasion to use a greater variety, and are not so limited in their proportions. I have read that the smallest head that is allowed, "as a rule," in a printing is the ninth part of a figure, and the largest the sixth part. These dimensions are the two extremes, an eighth or a seventh part being the proportion generally adopted—although it is stated that Raphael, in some of his figures, has little more than six heads and a-half.—I am, yours, &c.,

1, *Oxford-street, W., January* 26, 1874. J. HUBBARD.

[At the time of writing the article alluded to we had not the Crawshay conditions before us; and, from the constant reference to the term "head" in the discussions upon the subject, had understood the word in its real and literal sense to include all between the highest point of the skull to the lowest point of the chin, and this, we think, will be apparent to all who read the article. We take it that a *face* should be about three-fourths of the entire height of the head, measured, as stated, "from the top of the forehead to the point of the chin," and from this point of view the dimensions prescribed by Mr. Crawshay (seven and a-half to eight inches) is, undoubtedly, considerably in excess of "life size." Ten *faces* we take to be a correct proportion for the entire height of the figure, *not* ten *heads*, as we inadvertently assumed Mr. Aldridge to have said instead of what he really did say, which (*vide* our report of the South London Society meeting at page 31) was to the effect that "every artist knew that the standard proportion of the *face* was a tenth of the whole human figure." The confusion of the terms "heads" and "faces" is far from satisfactory; and, if attention having been drawn to the matter results in a clearer understanding upon the subject, our object in writing will have been gained.—EDS.]

THE ALKALINE DEVELOPER, &c.

To the EDITORS.

GENTLEMEN,—I render to Colonel Stuart Wortley my sincere thanks for his alkaline developer for dry plates, and I believe that every dry-plate worker who has tried it must acknowledge the same; for without it dry plates would be of very little use, while with it, applied to Mr. R. Manners Gordon's gum-gallic process, I have produced plates equal in sensitiveness to wet, and quite as good, and I believe in some instances even better.

I have also taken some very good negatives by the coffee process, which is rather slower. All being well I will forward you this summer two or three specimens (gum-gallic).

I have been trying dry plates occasionally for about two years, but I have now decided to entirely abandon the wet process for landscapes.

I see in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC that Colonel Stuart Wortley recommends gelatine in preference to bromide, but does not state the quantity. As I would like to execute work of the very best possible description, I should feel very much obliged if he would please to communicate the above information when convenient.—I am, yours, &c.,

Keswick, January 21, 1874. WM. FERGUSON.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—On behalf of the Committee of Management may I ask for space to acquaint photographers, both amateur and professional, with the fact that the Photographers' Benevolent Association is now established on a firm footing. The rules have been drawn up, approved by the Registrar, printed, and registered according to Act of Parliament, so that it has fairly commenced its legal existence. Some few of the officers have been chosen, subject to the approval of the members at a meeting to be called for the purpose of electing officers for the present year. It is, therefore, necessary that all who wish to join the Association, and take part in the election, should send in their names to Mr. Wilkinson, 14, South Street, Bromley, Kent, as soon as possible.

I may mention that the Rev. F. F. Statham, M.A., F.G.S., &c., has kindly consented to act as one of the vice-presidents, and Col. Stuart Wortley and Capt. Abney, R.E., have accepted the position of trustees. Letters of kindly sympathy with the objects of the Association, with offers of more solid support in the shape of donations and subscriptions, have been received from all the leading firms in London, and also from many well-known names among amateur photographers. It now remains for the assistants to take up the matter in the same spirit, and then we may hope to see the Photographers' Benevolent Association take rank among the foremost of similar associations in other professions. The amount of the subscription has been made purposely low to enable all classes of assistants to take advantage of its help in case of need.

The committee also invite amateurs, as they love the art they practise for amusement, to assist, by donations and subscriptions, in helping those who have to practise it for daily bread. Mr. Wilkinson will be most happy to answer any inquiries, and donations and subscriptions will be received by the London and County Bank, Bromley Branch.

The necessity for such an organisation has been acknowledged, and the few earnest men (mostly assistants) who have, by the expenditure of both time and money, brought the crude scheme to such a successful issue now invite all photographers to place this Association in the position it ought to occupy, as the benevolent association of a profession of such importance as photography.—I am, yours, &c.,

10, *Ashchurch Grove, Shepherd's Bush, W., January* 27, 1874. GEORGE CROUGHTON, *Chairman of Committee.*

METEOROLOGICAL REPORT,

For two Weeks ending January 28, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain fall.
15	29·95	WSW	47	50	51	47	—
16	29·60	SSW	46	48	51	46	—
17	29.53	WNW	37	39	43	36	0·09
19	29·68	WSW	46	48	54	41	0·02
20	29·71	WSW	52	53	56	45	0·63
21	30·16	WNW	41	42	—	41	—
22	30·48	SE	38	38	45	35	—
23	30·27	W	45	45	51	38	—
24	30·15	W	49	50	53	44	0·03
26	30·49	WNW	39	41	49	33	0·20
27	30·48	NW	47	49	51	39	—
28	30·57	NNW	45	46	—	41	—

EXCHANGE COLUMN.

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

I will exchange Winter's twelve-inch plate electric machine with condensing ring, and electrical sportsman, for a half-plate camera and landscape lens in good order.—Address, J. S. DICKIN, 17, Hargreaves-street, Burnley.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

Helsby and Co., Liverpool.—*View of Plas, near Bala, Merionethshire.*

R. Thompson, Liverpool.—*Photograph entitled "Much Ado About Nothing."*

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

K. T.—We have heard good reports of it.

R. R.—1. The parchment-paper received will answer for a dialyser.—2. You will find full particulars of the strong developer given at page 264 of our last volume.

A. G. M.—We advise you to use a collodion transfer process, that being the only one we at present know which will give good results with such a light. Mr. Brothers' address is St. Ann's-square, Manchester.

X. Y. Z.—1. Use a lens of shorter focus, and one that will include a larger angle.—2. Unless we saw the special lens referred to we could not advise you.—3. It is quite possible to get the finest lines delineated.

E. D.—1. Bromide plates lose sensitiveness upon drying, and they do not recover it on re-wetting.—2. Carbon tissue will answer for use in the camera *if you give a sufficiently long exposure*, but that exposure will have to be very long indeed.

W. H. MILLER.—The spots appear as if they were caused by the action of bronze powder; but we could not speak definitely unless we had a sample of the paper you used. The paper usually sent out by the same maker bears a good reputation.

A BEGINNER.—Much information on the subject of enlarging by the lime light will be found in our ALMANAC for 1870. The method inquired about as being described in the present ALMANAC is not suited for artificial light, but for printing direct.

S. WHITEMAN.—If the opal glass be flashed take the picture on the flashed side; if it be formed of pot metal take it on the finished side, whether it be roughened or smooth. The stains resulting from silver or other chemicals can be removed by nitric acid.

JOSEDE BRUNET (San Sebastian, Spain).—The *Manuel* will be forwarded this day, but as the Post-office authorities do not allow *bound* books to be transmitted by post to Spain, it is sent without covers. The other books were forwarded per post on Friday last.

MISS SMITH.—There is always a certain amount of risk and uncertainty in purchasing second-hand apparatus, but in business transactions with a respectable dealer you cannot be far wrong. We shall be happy to give you our opinion on any selection you may make.

W. B. FUNNELL.—This correspondent wishes Mr. Sutton to inform him which of the two formulæ is correct, viz., that in his pamphlet, in which a *five*-grain solution of bromide is recommended; or that in his article in last number, in which he recommends a *fifteen*-grain solution.

A TANNINITE.—1. So far from feeling inclined to dispute the accuracy of your remarks, and the deductions you make from your experiments, we are quite at one with you.—2. The substance you forwarded is nitrate of potash. No wonder, therefore, that you failed in making a "nitrate of silver bath" with it.

IODOFORM.—1. Iodoform is said to render collodion less repellant. It may be obtained by boiling together iodine, carbonate of potash, and alcohol.—2. Tone, in a collodion transparency, depends upon the preservative and the developer, rather than upon the nature of the collodion.—3. Caused by decomposition.

ROBERT BAXTER.—To fume paper, suspend it in a box, at the bottom of which is placed a dish containing strong ammonia; the colour of the finished print will be a deep, rich, warm velvetty-black. Your experience in the matter of freckles is not exceptional. Many hints will be found in back numbers of this Journal.

C. W. V. A.—Obtain a smooth slab, heat it, and lay on it a sheet of paper, which wax. Superpose a second sheet, which need not be waxed, but cover that with a third, which must be treated like the first. Continue this until the requisite number has been prepared, then iron them so as to thoroughly distribute the wax. Finish by ironing between sheets of blotting-paper to remove the excess.

W. S.—The cause of the greater marginal sharpness when using the condensers of longer focus is to be found in the fact of the relations of the separate cones of light to the object glass being different, one being more axial than the other. The flat side of the condenser must be next to the light. If this position be reversed there will be so much spherical aberration as to destroy the equality of illumination.

GEO. MOORE.—In the toning of the transparency, as well as in the toning of any print, a substitutionary action goes on—the atoms of silver which form the developed picture become converted into gold; but this must be accepted with certain limitations. To explain the exact reaction would be beyond the scope of an "answer" to a correspondent, as it might afford a fitting theme for a very long article. The chlorine liberated from the gold associates itself with the silver, so that if you merely dipped your transparency into chloride of gold, washed it, and then proceeded to burn it in you would have a silver as well as a gold image—a fact you would speedily discover in the disagreeable tone of the enamel. Try the following experiment:—Take a small negative, or a transparency—it matters not which—cut it up in several slips, tone some in various ways and with various agents, leaving one of the slips untoned. Now place them all upon the top of a *clear* fire, and allow them to become red hot. Remove them carefully, and allow them to cool. Each will possess a burnt-in picture, but the tones will be widely different. The images which contained silver will be of a yellow tone.

AN ASSISTANT.—Any of the pigments prepared for lantern slides which we have reviewed during the last few weeks will answer admirably.

ROBT. BRIDGART.—1. We quite agree with you as to the probable value of a large lens when compared with one of smaller diameter; but the advantage of a large lens is only appreciable when a large flame is employed as a radiant. To test this point, make a diagram of your condensers and lenses and assume the light to radiate from a point. The inutility of mere size, in such a case, will thus be seen.—2. Several objections of this kind are in the market.—3. An angle of light of 90° may be obtained; but to get that in your case an extra lens would have to be interposed between the flame and the condensers. Without this you cannot obtain any increase on the present angle of illumination. We advise you to try the experiment, using a plano-convex or, preferably, a slightly-menscus lens.

G. W. BRACEY.—Speaking in general terms, the larger a portrait lens and the longer its focus the more difficult will it be to obtain a very fine photograph of such a rounded object as a brain. But as time of exposure is not an element of consideration in a case of this kind, the most perfect sharpness may be obtained by using a small stop. If you extemporise a diaphragm of cardboard, with an aperture somewhat under half-an-inch, and insert this in the hood of the lens, so as to be pushed close up against the front lens, a perfect remedy will be obtained. Of course a longer exposure will be required. For the other class of subject a special description of lens will be required—one differing in some respects from those in the market. What is termed a "baby lens" would even be too slow. Lenses of this kind are occasionally to be met with, but they are of foreign manufacture and somewhat expensive.

RECEIVED.—D. Winstanley; W. E. Batho; "One who Was There."

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

THE PROPOSED NEW MEMBERS OF THE COUNCIL OF THE PHOTOGRAPHIC SOCIETY.—Mr. Woodbury writes to say that, while sensible of the honour conferred upon him by proposing his name for election, he fears that, if elected, the fact of his residing a few miles from town may operate in preventing him from filling the position in a sufficiently efficient manner. Mr. Woodbury, however, overlooks the fact that some of the oldest members of the Council reside at a much greater distance than he does from London. If elected he will, we feel assured, make one of the most useful members of the Council.

CORRECTION OF ADDRESS.—In the advertisement of Messrs. Sibthorpe and Austen, the well-known photographic artists to the profession, an important error of address has occurred in their advertisement, in connection with enlargements, painting, &c., for the trade, in our ALMANAC for this year, at page xxxviii. in the advertising sheets. Instead of No. 53, the correct address is *No. 35, Shrubland Grove, Dalston, London.* The transposition of the figures took place in a portion only of the impression. During the process of "machining" one of the rollers "drew" the figures, and in replacing them the machinist accidentally transposed them.

TRANSPARENCIES FOR THE LANTERN.—Mr. Woodbury has afforded us an opportunity of examining a new kind of hand-made lantern transparency which can be produced with great rapidity and is characterised by great vigour of outline. The special object Mr. Woodbury had in view in devising the method by which this picture was made was to provide for a want frequently experienced by lecturers who use the lantern as a mode of demonstration, in having a ready means for extemporising a diagram without incurring the trouble of getting it drawn and then photographed. The success which has attended Mr. Woodbury's efforts is undoubted, and we hope very soon to give our readers a detailed account of the *modus operandi.*

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 4	Edinburgh	The Hall, 5, St. Andrew-square.

LONDON GAZETTE, *January* 27, 1874.

PARTNERSHIP DISSOLVED.

WAKE and BAUM, Manchester and Altrincham, photographers.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 718. Vol. XXI.—FEBRUARY 6, 1874.

PRINTING WITH SALTS OF IRON.

From numerous letters received since our last number was published we perceive that considerable interest is felt in the subject of printing by aid of the salts of iron, and a strong desire is expressed that we should give some further information on this subject. In the present and in a subsequent article we shall give a variety of processes which depend upon that action of light upon iron and other bodies to which we alluded last week.

The ferric salts which are most easily decomposable by light are the ammonio-oxalate of iron, the ammonio-tartrate of iron, and the ammonio-citrate of iron. These are known by the more circumlocutory names of the oxalate, tartrate, or citrate of sesquioxide of iron and ammonia, both of which we shall cut short and adopt the simpler term ferric oxalate, tartrate, or citrate. It was with salts of this kind that Herschel's suggestive experiments were made.

Make a ten or twelve-grain solution of ferric oxalate, and with this brush over one side of a sheet of paper, which, after being dried, will keep good for several years, and be always ready for exposure. It is not sufficiently sensitive to be exposed in the camera, but it makes an extremely sensitive paper for printing upon under a negative. In the best of numerous pictures we have obtained by the method now described the exposure was not carried so far as to show a visible image upon the paper, although the highest lights were slightly browned. The picture keeps as well after exposure as before it, and the development may be proceeded with at any time. To do this all that is required is that a tuft of cotton, a soft sponge, or a camel's-hair brush shall be charged with a solution of ferrid cyanide of potassium, commonly known as the red prussiate of potash, the strength of the solution being of no consequence whatever. A picture in a beautiful blue colour instantly makes its appearance, to fix which nothing more is requisite than an immersion in water for a very short time.

If a picture taken according to the foregoing directions be washed over with a solution of bisulphate of potash, the blue colour becomes intensified.

A greenish picture is secured either by washing the print as originally obtained, with a solution of sulphate of copper, followed by rinsing with water, or by the addition of gum arabic to the solution of ferridcyanide without subsequent washing.

A picture of a dark-brown colour results from a wash of nitrate of silver solution; ammonio-nitrate of silver gives a tone of a different character, being greyish-black.

A pale-slaty kind of image is obtained by treating the picture with ammonia.

One can almost anticipate what the effect of a wash of weak chloride of gold solution would be; the characteristic purple colour is at once the result.

Other colours or tones are produced with other agents. But the sensitising agent and the developer may be mixed together previous to the paper being prepared; and in such a case the picture is developed by immersion in water. Dr. Halleur, to whose epitome of the processes of Sir John Herschel we are indebted for the details of some of the reactions above described, gives the following pleasing experiment, founded upon, if not directly deducible from, the famous communication to the Royal Society:—Dissolve one part by weight of ferric citrate in eleven parts of water, add an equal volume of a saturated cold solution of chloride of mercury, and with this *immediately* wash the paper to be prepared. After being dried the paper will be of a yellowish colour. Expose under a negative until a faint image is visible, and then apply a strong solution of cyanide of potassium, when the picture will be immediately developed. We epitomise another suggestive experiment from the original communication:—If paper be washed by a mixture of solutions of equal strength of ferric citrate and ferrocyanide of potassium, after being dried and exposed an image of a bright blue colour will be developed by simple immersion in water. Wash this image with a solution of protonitrate of mercury, when the picture will apparently be totally obliterated. Now wash thoroughly in water, so as to remove all the soluble salts, and dry the paper—for, as the *picture* has now been rendered invisible, the latter term cannot be applied to it. If now a hot iron be passed over the paper the picture instantly appears of a brown colour, and, curiously enough, it fades away in a few weeks if kept in darkness, but is susceptible of revivification by the simple act of again applying heat.

We shall resume this digest in our next, and shall then give the most modern and approved formulæ for the preparation of the various agents required in the production of photographs by the means that have been, or are yet to be, pointed out by us.

THE VICTORY OF REFORM IN THE LONDON PHOTOGRAPHIC SOCIETY.

The struggle to amend the constitution and the management of the London Photographic Society will next week probably be ended. The nature of the termination may be surmised from the circular which the Council have issued calling the special meeting for the ensuing Tuesday. This circular—after stating the objects of the meeting and giving *in extenso* the laws proposed by the requisitionists, which we have already published—announces the new policy of the Council, in which it hints more sweeping measures of reform than those proposed by the reformers themselves. This is news indeed! Instead of defending their own views and practices, they, seeing which way the wind is blowing, suddenly turn round, and now claim to be the advanced pioneers themselves! This conversion is very remarkable, and it might be ungenerous to look on it with suspicion. The reformers have secured more than they contemplated. They did try to bring their fellow-members to their way of thinking; but for the Council to claim to be converted, too, makes the success positively oppressive.

The exact form in which this new policy is expressed in the circular is that "The Council, ever anxious to consider the wishes of all members of the Society, and feeling satisfied that the laws in question can with advantage be placed on a wider basis, are of opinion that the choice of officers can be more completely placed in the hands of members, and a better facility afforded for frequent distribution of office amongst all the members, by an extension of the principle involved in the proposed rules and by a revision of other laws; they will, therefore, submit to the meeting an amendment." And what do our readers suppose is the nature of this ultra-liberal and comprehensive "amendment?"—this amendment that is to place the laws on a "wider basis" than the "proposed rules"—that is to cause "the choice of officers to be *more* completely placed in the hands of the members"—that is to afford a "*better* facility for frequent distribution of office amongst *all* the members?" What are the terms of this extraordinary "amendment" that, with such a flourish of trumpets, this obstructive body in its sudden fit of zeal for improvement proposes to the members? We feel that it is almost too bad to delay giving the valuable information that is to revivify the Society—that is to out-bid the reformers and to take the wind out of their sails. But here it is:—"That a committee be appointed, consisting of six members of the Society chosen by the meeting and three members to be nominated by the Council, to revise the laws and report to a general meeting."

We fancy we hear some one say "Is that all?" Yes, that is all; the whole truth is out now. "What! no statement of how all the promised good things are to be obtained?—no explanation whatever as to how all these blessings are to be accomplished?" No, none whatever—nothing but the appointment of a committee of nine, two-thirds of which the Council will graciously permit the members to appoint; the remainder they reserve for their own nominees. How can we sufficiently admire the amiable self-denial of these self-elected ones in permitting the members to name *any* of the committee! Can greater proof be needed of their earnestness for reform than in allowing the Society to have even some share in the management of its own affairs? We trust the members will keenly appreciate this condescension, especially when they remember how the first requisition was, contrary to the very words of the law, contemptuously ignored; how the second requisition has been disrespectfully treated; and how when the vital interests of the Society are in peril they, instead of devoting an evening to consider its welfare, merely call the general meeting an hour and a-half earlier, and attempt to shirk the whole subject by appointing a committee, in the composition of which they insult the Society by attempting to usurp a considerable share.

We trust the members will not allow themselves to be led away by this plausible artifice, the whole purpose of which is to prevent, by a side-wind, the Society expressing in open meeting the principles on which it wishes its future affairs to be conducted. Despite the fulsome phrases, it is an attempt to perpetuate the practices of the Council of doing privately and in secret that which should be conducted in public. The terms in which this amendment is expressed exhibits in an offensive form the arbitrary character of the Council. It is absurd to suppose that any of the members can have a right to dictate that a certain proportion of itself shall be on any committee. It is a fundamental principle of all societies that the members shall select whom they think proper, whether they accidentally hold office or not. It is fitness, not office-holding, that constitutes qualification; and on some occasions this distinction is unusually important.

That a committee is necessary to revise the laws, and to make them accord with each other, is obvious enough; and an arrangement for such purpose was made at the last meeting. There was no need whatever, therefore, for this amendment of the Council's. An important difference, however, exists between the two propositions for appointing the committee. In the one to be proposed by private members there will be no limitation of the number, and no dictation as to its composition; all that will be properly left to the members. We see no reason why a member or many members of the Council should not be appointed on so important a committee, but certainly not because they hold office. In the present juncture of affairs some may think, with good reason, that such is a positive disqualification. No more perfect means for preventing the Council members being elected on the committee could be devised than by adopting this arbitrary dictation. Even worms will turn, and though the members have for a number of years been "sat upon" the present movement shows that their independence is not entirely crushed out.

It is easy to see why the Council have thus worded their "amendment." They are conscious that the members will not believe in their new-fledged zeal for reform, and recent proceedings of the ruling majority of them have given good reason for this want of faith. Seeing that, despite their obstruction, they cannot prevent improvement, they suddenly turn round and try to share in the credit of doing that which they have so unsuccessfully opposed. They wish, therefore, to have a hand in the matter; and, fearing that they may not get voluntarily elected, they endeavour to make terms, so that even a small number of them may participate in the good work. But they are not wise in their generation, and if they persevere in their dictatorial conduct they will have only themselves to thank if they are excluded from even a faint show of effecting the improvements.

We are anxious that our readers should estimate at its exact value this sudden exhibition of the Council's desire to extend the privileges of the members, and one fact will show it as well as a score. At the forthcoming meetings of the Society no member will be permitted to vote unless he has paid his subscription for the year 1874. During a long experience, we have never known this authority to be exercised before—either at meetings when the laws were altered, or where matters of the deepest importance were settled. The only reason for now using this extreme test being to cripple and limit as much as possible the power of voting, so as to reduce the majority which the Council dread. We should have thought that the sending the Society's journal and the regular notice of meetings would have been considered the test of membership—and so it usually is; but this Council, despite its professions of liberality, dare not trust the members, and they thus propose to hamper them in the exercise of their voting by this unusual innovation. So much for their new-born desire to "consider the wishes of *all* the members of the Society." "No money, no vote"—that is the last threat, and the latest invention to annoy the members.

The course of the members is straightforward, simple, and clear. It is to ignore the Council's amendment as inappropriate and offensive; to pass the new laws, even if they do not approve of all the details; and at a later period of the evening, when the motion comes on according to the notice given, to appoint the Committee of such numbers and of such men as possess their confidence irrespective of their being office-bearers or not. There are a few good men in the Council whom, despite their antecedents, we should be sorry to see omitted, and it will be for the meeting to appoint them or not, as it sees fit; but there must be no dictation, or the vital principle at the bottom of this movement—freedom of election—will be violated.

It will be the business of this committee to revise all the laws—new ones, if they can be improved, as well as the old ones—so that they shall be plain, clear, and in harmony with each other. It is highly important that the principles which are to underlie the laws should be distinctly expressed by the meeting; for, to appoint a committee, as the Council proposes, without communicating instructions is only to set men to work in the dark, and to cause to be fought out in private that which ought to be settled in public.

There is one thing, however, that we have peculiar gratification in recording—that the reform movement is successful. The necessity for it is admitted, the machinery for accomplishing it is at work, and the only struggle now is—who is to do it, and how is it to be done best. We credit the Council with wisdom in surrendering a lost cause. Their case was simply indefensible. They have come reluctantly to this conclusion, and their intermediary steps have been uncourteous and offensive. We daresay they now see it, and if they had the work to do over again they would accomplish it with less ill grace. At first the disaffection was denied; then it was attempted to be pooh-poohed; next it was declared to be exaggerated; and, finally, now that it is admitted, the obstructives are trying to win in the race for improvement by outbidding the reformers. It's a case of "Codlin's your friend—not Short." It is a curious position, and very amusing. Your recent convert is always the most demonstrative.

The victory has been won before the battle was fought, and the enemy has surrendered. As the walls of Jericho fell before the blast of the trumpet, so has this wretched organisation gone to pieces directly the aroused indignation of the metropolitan members was directed against it. This Council—this "old man of the sea" that has ridden so long on the shoulders of the Society—will shortly be removed; and whatever vitality there is left in the Society will soon have the opportunity of showing itself. Our only regret is that this state of affairs was permitted to last so long.

REPRODUCED NEGATIVES.

The reproduction of negatives is a point which has never been sufficiently insisted upon by photographers who have to produce, often within a comparatively short space of time, a large number of prints of one particular subject, a negative of which cannot, from its very nature, be obtained a second time.

We are moved to write upon this subject in consequence of seeing only the other day, in the hands of a professional photographer, a negative from which some thousands of prints had been taken, but which, as may readily be imagined, was in by no means the same state as when originally produced. Upon expressing some regret at finding a negative which had originally been good in such a state our sorrow was very fervently echoed by our friend. He informed us that the negative in question had never been out of the printing-frame. He added that he could not supply one-quarter of the demand for prints from it, and those that he could produce now were unfortunately far inferior to those he had been able to supply when the negative was in its pristine state. On inquiring why he had not had the original reproduced in the first instance, the reply was—"Oh! prints were wanted from the negative as soon as they could be produced, and it was never anticipated that there would be more than an ordinary demand for them."

All regrets are now unavailing; for the negative is ruined, and whatever impressions are obtained from it can only be made presentable by an amount of labour in "touching" and "spotting" which must almost more than double the cost of the production, and in the end prove vastly inferior to the early impressions from the same plate. The subject—a portrait of one whose memory will be revered for many a year, and for whose features perhaps those who come after us a century or two hence would give worlds to recal—can never be reproduced. What, then, is to be done? It is now *too late*, and *nothing* can be done to remedy the matter. This is only one out of hundreds of cases constantly recurring, and the question is how to avoid them in future.

The reproduction of a negative is by no means an easy matter, if we desire to obtain *really* a reproduction—one which shall be absolutely as good as the original plate. Some years ago it was proposed to obtain a transparency upon collodio-chloride, and from this, by a second printing, to get a negative. Attempts were made in this direction, but with very indifferent success.

Some remarks we made in a recent number of this Journal (that for January 23rd) have a bearing upon this subject. We were then drawing attention to the various methods of obtaining transparencies for the purpose of producing enlarged negatives; and the objections we then made against collodio-chloride, *except in certain cases*, hold good in even a greater degree on the present occasion.

In a short paper in our Almanac for the present year, by Mr. H. J. Burton, will be found some very trite and sensible remarks on this subject, which we deem a matter of the greatest consequence to those who publish portraits and views for sale.

We had the opportunity, a short time since, of looking over a number of negatives reproduced and reversed for printing by one of the photo-mechanical processes, and of comparing them with the originals from which they had been made. We were surprised at the *absolute perfection* of the reproduction.

But the objection may be raised—"We wish to see a print from our negative as quickly as possible, and to get the proofs into the hands of our agents without an hour's delay." This is a mistaken notion; for it would undoubtedly be wiser to wait twenty-four hours, or even longer, to ensure the production of a *perfect* transparency—which is all that is necessary as a *cliché* to obtain as many new negatives as may be required—than to risk injury to an original, upon the safety of which depends, perhaps, the power of producing thousands of copies afterwards.

OPTICAL "RAPIDO-MANIE."

Such is the facetious title which the Astronomer-Royal for Scotland has given to an interesting article in The British Journal Photographic Almanac for the present year, in which he describes the success which he has achieved in a new method of flattening the field of a portrait lens with full aperture, which consists in exposing the sensitive plate whilst it is in the bath, the front of the bath being composed of a plano-concave lens about the same size as the plate, with its concave side outwards. The term "rapido-manie" is due to M. de Constant, of Lausanne, and has been introduced by him in derision of all attempts to make our plates more sensitive and to shorten our exposures. But this opprobrious term, Professor Smyth tells us, has only convinced *him* "that the object is more important than ever, and that no time should be lost on the part of any of us in advancing it whenever possible." Let us, then, set to work, and discuss at once the Professor's new method.

But at the very outset we are met by a difficulty; for it is considered by most of us that that gentleman is greatly in advance of the times in his method of view-taking, for he works upon little plates an inch square—"poor-man" fashion, as he tells us—and then enlarges up to twenty feet in diameter! Many people shake their heads incredulously at the practical wisdom of this. For my own part I know nothing about it; but this I know, that I have seen under the microscope a whole family group beautifully depicted in a single drop of collodion, and, what is more, I have great faith in the statements of leading men of science, when they are good practical men, and discourse to us upon matters which are quite within their own province.

Since, then, the common practice is not to expose the sensitive plate whilst it is in the bath, but when it has been put into the dark slide, I have endeavoured to find some means of adapting Professor Smyth's method to our ordinary practice, and the following is the suggestion which I have to offer:—

Instead of working upon flat plates three and a-half inches square when taking instantaneous views with a portrait lens of full aperture, let us work upon the flat side of a plano-concave lens three and a-half inches diameter, the concave side being turned towards the lens of the camera. The hollow side of this piece of glass—for I cannot now call it a plate—will then, if made of suitable radius, flatten the field in the same way as the concave front of Professor Smyth's glass bath, and will lengthen the oblique pencils until they reach the posterior flat surface, and come to a sharp focus upon it. The negative can then be printed by contact with a dry albumenised plate, so as either to produce a positive transparency, from which an enlarged negative may be taken, or a magic lantern slide, or the printing may be done by means of a copying camera; for, be it observed, the concave side of the negative will have no effect upon the result, provided the flat side upon which the film rests be placed inwards and next to the copying lens.

The radius of curvature of the hollow side of this piece of glass must be less than the radius of curvature of the image, and the glass must be placed so that the focus of the oblique pencils before refraction may lie within the glass, and after refraction may reach the film. That this effect will be produced is evident, because these pencils will impinge upon the glass at a slight angle of obliquity, and therefore the theorem given in my *Dictionary of Photography* relating to oblique incidence upon concave surfaces will apply here.

The sharp edges of the hollow side may, of course, be ground down so as to leave a flat annulus which will be against the woodwork of the dark slide.

And now I fancy some readers may be ready to exclaim—"But think of the *cost* of working upon such plates! Why, each plate would cost £1, or more!" Well, I will grant it, if you like; but would not a good instantaneous negative upon such a plate be worth five times that sum? And might it not be cleaned off after a positive transparency or two had been printed from it, and be used again? And after it had been used so much as to get scratched upon the flat side by frequent cleaning and polishing, might it not be repolished for a couple of shillings and be as good as new?

With respect to exposing an iodised or bromo-iodised plate whilst it is in the nitrate bath, we must not forget that, although *practical* difficulties may be got over, yet that some rather formidable *chemical* difficulties remain. A plate of this kind must not be left too long in the bath or it will fog, in consequence of the formation of iodo-nitrate in the film. It must be removed as soon as the greasy streaks disappear if you want a plucky negative. This is rather an unknown feature of this mode of exposing plates, particularly in hot weather.

Some years ago, at the time when the panoramic lens was on the *tapis*, I suggested a mode of exposing a curved glass within a camera which was to be filled with a transparent liquid—such as bath solution, water, or solution of some kind of organic matter. This liquid was to be in contact with the lens as well as with the sensitive plate; but the lens was not to be of the usual spherical form, but only half a sphere, composed of the front piece of glass together with the stop. The focus was much lengthened in consequence of the removal of the posterior portion of the sphere, and the whole arrangement was rendered achromatic by giving to the inner radius of the front glass a suitable length depending upon the refractive and dispersive properties of the liquid within the camera. According to my present notions, that liquid would not be a solution of nitrate of silver, but simply water containing a trace of some suitable organic matter which would give a colourless solution, and the sensitive film would be one of washed bromide of silver. The plan, I firmly believe, would answer, but it has never been tried. A plate similarly prepared, and placed in a similar liquid, would answer equally well if exposed in a bath according to Professor Smyth's method. It must be remembered that a washed bromide or bromo-iodide film imperatively requires the presence of a suitable kind of organic matter in contact with it during the exposure, so that a bath of plain water would not answer the purpose.

Returning to the subject of the portrait lens used with plano-concave glasses, the next question to consider will be the best form of instantaneous shutter.

On this subject we have had a very instructive lecture from Mr. J. T. Taylor in the ALMANAC for this year, and he lays it down as a principle that every part of the sensitive film should receive during a brief space of time the concentrated rays or focus of a whole pencil. There can be no doubt this is perfectly true, and the shutter with a horizontal slit in it, which he recommends to be placed immediately in front of the film, and to fall from top to bottom by its own weight, would answer the purpose.

Mr. R. M. Gordon showed me, in the autumn of 1873, his guillotine shutter, made, as I understood, exactly after the pattern of Mr. England's; but this was placed immediately behind the lens, and was adapted to the front of the camera. It was said to answer perfectly; and yet I cannot help suspecting now that it ought to have been a case of the "failure of Taylor's theorem" (as a mathematician might say when alluding to that celebrated binomial expansion).

It is some years since I gave my attention to this matter; but I remember once suggesting somewhere that there should be an instantaneous diaphragm with a round hole in it at the usual place occupied by the diaphragm, and that this should fall between two saw-cuts in the lens tube, and thus expose the plate. By this plan I imagine Taylor's theorem would not be set at nought, but fully satisfied, and even more than satisfied.

But, after all, the best camera and glass for instantaneous pictures may perhaps turn out to be the following, and it would be "*rapido-manie*" in great earnest:—

Go back to Martin's panoramic camera for curved daguerreotype plates, but use a sensitive curved *glass* plate instead of a silver one. In front of this we shall then have a revolving tube with a portrait lens at one end and a narrow vertical slit at the other end, close to the glass. By making this tube swing round from left to right, or conversely, every point upon the film would receive the impact of a whole pencil, and the view might include one-fourth of the whole horizon in good focus up to the margins. Fancy coast scenery, with a glorious sunset, breaking waves, and figures, taken instantaneously in this style, and including such an enormous sweep of angle! What a complete picture it would make, and how it would astonish the artists who affect to decry photography!

All these various suggestions I now leave to the consideration of my readers, and more especially of our scientific friend at the Edinburgh Royal Observatory, if he should deem them worthy of his notice. If we are ever to advance in our art it must be in the direction of "rapido-manie." THOMAS SUTTON, B.A.

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IN the course of last autumn an R.A. wrote a letter to *The Times*, in which he called attention to what he terms "an artist's difficulties;" and this brought forth a flood of correspondence in which a great variety of views, relevant or otherwise, was developed. The artist's difficulties were really no other than the ordinary difficulties which daily happen from loose contracts. Nine-tenths of the quarrels and lawsuits arise from this cause. A, in ambiguous terms, orders one thing, and B executes it as he understands it. Dispute immediately arises. There was no specialty in the "artist's difficulty," and why *The Times* should have given insertion to it is not quite clear. As well might they have inserted Jones's quarrel with his butcher or his baker. Whether what the R.A. said included with it an order for the negative must depend on the terms.

The R.A. claimed under his bargain the right to a negative, whilst the photographer, on his understanding of the contract, denied the validity of the claim. Everything turned on the terms of the order or commission given; but, singularly enough, the whole discussion, whether between the parties themselves or among the correspondents, proceeded without reference to what had really taken place. All sorts of conclusions were drawn upon absolutely hypothetical facts, and all sorts of hypothetical law was also assumed as applicable to this variety of hypothetical facts. No one seemed to think it necessary to inquire what the facts actually were, and save in some leaders in the photographic journals no allusion was made to this point.

The R.A. himself did not seem to be aware of his rights under the Copyright Act, which, even on an adverse assumption of facts, would have removed the principal ground of his complaint—that he was left without control over the negative. If he were ignorant on this point it was remarkable to observe how little the others knew of the subject, and what vague notions of copyright pervaded the whole of the correspondence. All sorts of law were propounded. Some writers, indeed, did condescend to refer to the statute, but where they did it was generally to misinterpret its provisions; whilst others, more independent, evolved their law (as the German did his idea of the camel) out of their own inner consciousness.

Seeing such a state of things, and finding from my intercourse with a large number of photographers that there is much misapprehension afloat, I venture to think that I may be doing some service by stating in a popular form, divested of legal phraseology, the broad features of the law of copyright. They are very simple, and admit of being very shortly stated.

Firstly: as a general rule the author of a photograph—that is, the photographer—is the owner of the copyright.

If, however, he take it on commission the copyright belongs to the party giving the commission; but he (the photographer) may retain the copyright if he take a memorandum to that effect in writing from the party giving the commission.

But, observe, when a *negative* is *sold*, then the coypright does not pass with it to the purchaser, unless the seller or his agent executes at the time a writing to that effect; and the seller does not retain the copyright unless the purchaser at the time executes a writing to that effect. If no writing be executed by either party the copyright is irretrievably gone, and there is no power of reviving it. Bear in mind this relates solely to the case of the *sale* of a negative. Some persons, reading the Act superficially, mistake the purport of the proviso at the end of the second clause, and seem to imagine that it applies to the case of a commissioned photograph, whereas it applies only to the case of a purchaser on the first *sale of a negative;* and this is readily seen, as the words "vendee or assignee" only are used.

Again: I often find photographers claiming the sole right to reproduce copies of every photograph originally executed by them, and put it forth as a hardship that parties get them copied by others than the original producer. This is simply a question of copyright. He who has the copyright may do what he pleases and employ whom he pleases for this purpose; and it is obvious it would be a hardship if it were otherwise.

In all cases it is necessary for the owner of the copyright to register at Stationers' Hall; and here let me point out an erroneous but prevalent notion as to registration. It is frequently supposed that registration confers copyright. Registration, though a necessary formality, confers no copyright; it simply clothes the owner of the copyright with the power to enforce his rights before the legal tribunals of the country.

A few years since I wrote a short article, which appeared in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1869, on the subject of copyright, to which I hope I may, without egotism, be allowed to refer my brother photographers for information on this subject, inasmuch as it was written after repeated and lengthened consultations with the late Lord Westbury, both as Attorney-General and as Lord Chancellor, on every clause of the Bill, and also with Sir Roundell Palmer, who, as Attorney-General, conducted the Bill successfully through the House of Commons. Besides this the article itself was very carefully revised by my lamented and dear friend, the late D. Roberton Blaine, than whom it was admitted in Westminster Hall there was no more accomplished lawyer in this branch of legal learning. I feel that under these circumstances I am fairly justified in drawing attention to the article. Whatever merits it possesses are due, not to me, but to the special circumstances which enabled me to put it together. P. Le Neve Foster.

[The article to which Mr. Foster refers in his present paper is so valuable that we make no apology for transferring it from our Almanac of 1869, which has been out of print for more than four years, to the pages of The British Journal of Photography. It is the most valuable and reliable article on the law of copyright ever published. We give it below.—Eds.]

COPYRIGHT IN PHOTOGRAPHS.

"For immediate disposal, a Well-Established Photographic Business, in full working order, with Dwelling-House, Glass Room, Apparatus, &c., complete, *with Five Thousand First-class Negatives*," &c., &c.

Such advertisements are constantly seen in our photographic journals, and yet I am inclined to think, from conversations and correspondence I have not unfrequently had with photographers, that, simple as the transaction appears to be, both seller and purchaser have no very clear ideas of their rights as regards the negatives with which they are dealing. I propose to call attention to a few points which should be considered by both parties when engaged in such a transaction as the above.

Until the passing of the Act of the 25th and 26th Vic., c. 68 (29th July, 1862), a photographer, like a painter, had no copyright whatever in his works. That Act was prepared by a Committee of the Society of Arts, after carefully investigating the subject and collecting the views of painters, photographers, publishers, and others interested in works of art; and if it does not effect all that was required in the amendment of the law of copyright in works of art generally —and there is still much remaining to be done—it must be remembered that by that Act the great principle of copyright was for the first time established in behalf of paintings, drawings, and photographs. It was thought well by its promoters to get a bill passed, confessedly imperfect, rather than run the risk of getting nothing by endeavouring to make it more complete and extensive. By attempting too much, a failure *in toto* might have been the result.

Such being the case, let us see what the bill did accomplish, and what are the rights of buyer and seller of the negatives in question. I will endeavour to give these in the terms of the Act, omitting, for simplicity's sake, the words applicable to paintings and drawings, and getting rid as far as possible of technical legal terms. The Act, then, reads thus:—

The author of every *original* photograph which shall not have been sold or disposed of before the passing of the Act shall have copyright* *in such photograph and the negative thereof* for his life, and seven years after his death.

The Act then proceeds to deal with certain exceptional cases, and provides that when *the negative* of any photograph shall for the first time after the passing of the Act be sold or disposed of, or shall be made or executed *for or on behalf of any other person for a good or a valuable consideration*, the photographer shall not (as without this provision he would) retain the copyright thereof, unless it be expressly reserved to him by agreement in writing signed at or before the time of sale by the purchaser of the negative, or by the person giving the commission; but the copyright shall belong to the purchaser of the negative, or to the party giving the commission as the case may be, save that, in the case of the *purchase* of the negative, a further act is required to vest the copyright in the purchaser, viz., the seller or his agent must, at or before the time of sale, sign an agreement in writing to that effect. The words expressing this latter necessity were added during the passage of the Act through Parliament, and, though their meaning is clear, are a somewhat clumsy addition to the cause.

Next: the proprietorship of every copyright and every assignment of it must be registered at Stationers' Hall, and, although there is no specified time within which this registration must be effected, yet it is most imprudent to delay such registration, because the Act goes on to provide that no proprietor of a copyright shall be entitled to the benefit of the Act until registration is made; and no action shall be sustainable, nor any penalty recoverable, *in respect of anything done before registration.*

* By "copyright" is meant, in the words of the Act, "the sole and exclusive right of copying, engraving, reproducing and multiplying" a "photograph and the negative thereof, by any means and of any size."

Now, let us see how the foregoing is applicable to the negatives in question. What has the seller to sell, and what does the purchaser get when he buys? The negatives will consist of two classes.

Firstly. Those which the photographer has taken on his own account; and,

Secondly. Those which he has been employed to take; or, to use the words of the Act, those "executed for or on behalf of another person for a good or valuable consideration."

The first division will include views of places of interest, reproductions of paintings, sculpture, engravings, and portraits of individuals of note whom the photographer has induced to sit to him. In all such negatives made on his own account the photographer has the absolute property and copyright; but the purchaser, before completing his purchase thereof, should carefully ascertain, by searching the Register at Stationers' Hall, that the works he has bought have been accurately *registered* in the name of the seller, and that their *identity* is unquestionable. Upon the completion of his purchase he should also be careful to register the assignment of the copyright to him. Prior to incurring this expense he will, of course, be guided by the prospect he has of turning the negatives to commercial account. Practically, such negatives usually come under the clause relating to the sale of negatives for the first time after the passing of the Act in 1862; and in such case an agreement in writing must be signed by the vendor or his agent *at or before the time of sale*, thus vesting the copyright in the purchaser. If this be neglected, the copyright will be entirely lost, for by the Act it is not to be retained by the vendor; and the purchaser only gets it, as has been before stated, by agreement in writing signed *at or before the time of sale*. The omission is, therefore, irreparable, and the copyright irrecoverably gone. If, also, any of the negatives should have been *purchased* by the seller of them, then it should be carefully ascertained, before completion of the purchase, that the seller, when he purchased them, observed similar essential formalities for preserving and registering the copyright.

As regards the *second* division of negatives, viz., those which the photographer has been employed to execute, they will include the general run of portrait negatives taken in the usual course of business. In every such instance, though the materials of which the negative is composed are the property of the photographer—that is to say, the glass and collodion film with the picture impressed upon it—yet the *copyright* becomes the property of the person on whose behalf it was taken "for a good or valuable consideration;" and the photographer has no right whatever to print a single copy from any such negative, except by the order or licence of the party on whose behalf the negative was made. It would be such a breach of duty on the part of the photographic artist as would render him liable to all the penalties of the Act against pirates of copyright.

And here it may be well to caution photographers generally, and particularly the purchasers of negatives, to be especially careful about the registration of copyright in any photograph. There is reason to believe that it is by no means unusual for photographic artists illegally to claim and register the copyrights in *commissioned* photographic works. This observation especially applies to portraits of celebrated persons. Nothing can be more improper or unjust; and in every case, therefore, where the *copyright* in a negative is purchased, and especially from a photographer, it should be carefully ascertained that he really is the proprietor of the copyright. For that purpose, the registration at Stationers' Hall is worthless if it should turn out upon inquiry that the photograph registered was a *commissioned* work, and, consequently, that the copyright originally vested in the employer and not in the photographer.

Again: don't let a photographer imagine that, because a *negative* lawfully remains in his possession, he can legally do what he likes with it. He may, it is true, if he like, clean the film from the glass and use it again, unless, indeed, he has, as is often the case, undertaken to supply subsequent copies at certain rates of charge. In this case the question arises—How long is he bound to retain the negative on the glass for this purpose? The answer to this will depend on the circumstances in each instance, namely, the terms and conditions under which the negative was made. All that can be said generally is that, in the absence of any express stipulation to the contrary, the law would hold the photographer liable only to keep the negative for a *reasonable* time.

In dealing with the copyright question generally, it will facilitate arriving at a just conclusion always to bear in mind that the negative is one thing and the copyright another. The two do not, upon the sale of the negative, necessarily pass together; that is, the sale of a negative does not transfer the copyright, and *vice versâ*. In short, the negative and copyright are perfectly distinct; the right to use the negative, which is, in fact, the copyright, is the point never to be lost sight of, and which copyright, in the case of *commissioned* works, can only be acquired by the photographer under an agreement in writing, which must be followed by registration at Stationers' Hall, as previously stated.

But, supposing the transfer of negatives and copyright to be complete, together with all the formalities of registration, the purchaser must still bear in mind that, in issuing prints from any of his purchased negatives, he must *not* place *his* name, initials, or monogram on them, or the name, &c., of anyone who did not execute the work. The Act of 1862 makes it penal in any one "fraudulently" so doing—*i.e.*, doing it so as to make it appear the prints are from the work of some one who in reality did not execute the negative. The penalties are recoverable by summary proceedings before two justices, as well as by action at law. I may add that copyright is made *personal* estate by the Act, consequently, on the death of the proprietor, it vests in and may be dealt with by his executor or administrator like any other personal property.

There are many other points connected with copyright which I have not thought it necessary to enter upon here, such as what are and what are not piracies, in what may copyright be acquired and in what not, &c., &c. I have simply drawn attention to the broad principles on which the law is based, in the hope that it may serve, to some extent, as a guide to parties engaged in transactions such as those to which the advertisement at the head of this article refers. Details can only be dealt with as each case arises, and these necessarily depend upon the particular facts relating to that case.

P. Le Neve Foster, M.A.
Barrister-at-Law, and Secretary of the Society of Arts.

SUB-BROMIDE OF SILVER.

The question raised by Mr. Stillman of the probable formation of a sub-bromide of silver in emulsions containing free nitrate is one of the highest importance in connection with the theory of dry-plate photography. It is rendered, however, more difficult of solution in consequence of the doubt as to the existence of a sub-bromide at all. Without offering to assert that the salt is formed under the circumstances mentioned, I would bring under the notice of my readers some experiments which have resulted in the formation of a substance behaving apparently as we might expect a sub-bromide of silver to do.

A few months ago, while engaged in making several of the double salts of silver for experimental purposes, I was struck by the behaviour of the product of one of my operations. Upon considering the circumstances under which it had been formed the only conclusion I could arrive at was that it was a sub-bromide; but, on repeating the experiment, I failed in reproducing the result, and the matter had been forgotten until recalled to my mind by Mr. Stillman's new theory. I have recently, however, succeeded in forming the substance with tolerable ease—though, it must be confessed, not with a constant result, but still with sufficient certainty to afford encouragement.

The first result attained was in forming a bromo-nitrate of silver by fusing together the nitrate and bromide of that metal. When properly conducted this operation results in the fusion of the two substances without any evolution of gaseous fumes, the product, when solidified, consisting of a hard, crystalline salt, rather similar to the fused nitrate, and but very slightly soluble in water. By some accidental variation in the proportions of bromide and nitrate, and probably the amount of heat used, I, upon one occasion; produced an opaque mass resembling bromide of silver. Thinking it consisted of bromo-nitrate, with excess of bromide in combination, it was subjected to the action of boiling water (for the purpose of extracting the former salt) until no further traces of soluble matter remained. The residue was found to be insoluble to any material extent in solutions of hyposulphite of soda or of ammonia, and was not visibly affected by nitric acid. In colour it much resembled the bromide, being, perhaps, a shade greyer, and under the action of light it darkened to a pale slaty grey, the colour being removed by nitric acid or bromine. After treatment with either of the last-named substances it became soluble in hyposulphite of soda or ammonia without any great alteration in bulk—in the case of nitric acid the solution poured away giving traces of nitrate of silver. This experiment I repeated, using various proportions of the two salts, in the hope of discovering the equivalents in which they combined; but hitherto I have been unable to do so.

I then varied the mode of procedure by first dissolving the nitrate of silver in a small quantity of water, adding successive quantities of bromide of silver, and evaporating to dryness. The changes which take place are instructive. Upon the application of heat the bromide rapidly darkens to something of the colour of the oxide, and, when nearly the whole of the water has been driven off, dissolves completely. By the addition of fresh quantities of bromide, together with a drachm or two of water, the point of saturation is attained, and upon then driving off the whole of the water, and allowing the fused mass to cool, a residue is obtained exhibiting no traces whatever of free nitrate. During the latter part of the operation copious fumes of nitrous acid are given off, ceasing when the process is almost complete.

The residue thus obtained may be considered to consist of sub-bromide of silver, together with a little bromide, and probably also a trace of *nitrite;* but the latter, if present at all, is in very small quantity. The formula of this sub-bromide—if such it be—requires further investigation. My observations thus far would lead me to give it approximately as—

$$Ag_3\,Br_2,\ \text{or}\ Ag_2\,Br.$$

By using a little over two equivalents of bromide to one of the nitrate in the operation described above I obtain a residue containing a little unchanged bromide, the exact quantity I have not yet discovered. A very slight error in weighing the salts would vitiate any attempt to arrive at a correct result, and it is very probable that more than one subsalt may be found.

As a second variation of the experiment sixteen grains of nitrate of silver were dissolved in half-a-drachm of water, to which I added ten grains of bromide of cadmium dissolved in a similar quantity, and proceeded as before. In this case the salts were employed in the proportions represented by an emulsion containing an excess of three and a-half grains of silver to the ounce. The residue showed no traces of either nitrate of silver or cadmium, and its bulk was very appreciably decreased by solution of hypo., showing a large proportion of unaltered bromide.

These crude experiments must be taken merely as an attempt to verify the possibility of forming a sub-bromide of silver, and are not put forward to establish any formula, their incompleteness rendering that obviously impossible. As regards the formation of the sub-bromide in an emulsion, my experiments tend to negative the probability of its existence in the presence of free nitric acid, which would necessarily remain in solution if the silver of the free nitrate were absorbed by the bromide. W. B. Bolton.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I wonder to what cause I am to attribute the fact that, when trying some lime balls made according to Mr. Gilmour's method, they split up and fell to pieces. They looked very well, and I thought that natural lime for illuminating purposes would, for me at least, become a thing of the past. As others are reported to have succeeded so well with the artificial lime balls, I am desirous of knowing the best conditions under which to make them, so that in future I shall be more independent of natural product than I have been for several years.

The experience of Mr. Herbert B. Berkeley in relation to the insolubility of precipitated pyroxyline in alcohol is quite in accordance with my own experiments. Some months ago I precipitated a quantity of pyroxyline by a copious addition of water to the collodion, and, after collecting the precipitate and drying it, I had afterwards occasion to immerse some of it in rather strong alcohol as a step preliminary to that of placing it in ether. The alcohol in which it was immersed shows no indication of its containing anything whatever in solution. I have poured a pool of it on a hollow glass plate, but no pellicle is left after evaporation, which certainly would have been the case if it had been a solvent of the pyroxyline.

Mr. W. B. Bolton appears to have solved a problem on which many have been working, namely, a collodion process in which the whole operation of making a plate ready for exposure in the camera should consist in pouring on the collodion. I am not in a position yet to offer any opinion upon it from personal experience; for, although I usually manage to find time to try every new thing that promises well, I have not yet had an opportunity, during the few days which have elapsed since the description of the process appeared, to give it a trial. At first sight, however, it seems to comply with all the conditions necessary to success; and, if it really be found to answer the expectations raised by Mr. Bolton, no one will hesitate to award to him the undivided honour of being its inventor or introducer. If time and weather permit I shall, before my next *Notes* are written, be in a position to give the results of several trials with this simplest of all processes.

But that I fear to bring down upon my head and about my ears a perfect deluge of sabbatical arguments "frae the north," I should make a few observations upon Dr. Nicol's introduction of an opinion upon a disputed theological dogma into a paper contributed to a photographic society. In Edinburgh some societies exist in which party politics and theological doctrines are eschewed; and I think it would be wise to introduce a rule excluding their introduction at the meetings of photographic societies established in places where, from peculiar education and temperament, extreme opinions on religious subjects are held, and apt, occasionally, to be strongly expressed. In the present case Mr. Nicol has published his fiducial belief in one of the ten commandments; would it be contrary to the precedent thus established if another member were to introduce a discussion upon that clause in another commandment which says "thou shalt not make any graven image, nor the *likeness of anything*," &c.? or, to pass to more recent theological dicta, pronounce an opinion upon one of the chapters in the *Confession of Faith*?

Mr. B. J. Edwards must certainly either have been misreported, or have been speaking without due deliberation, when he gave expression to the opinion with which he is credited that a slight want of sharpness in a *cliché* intended for enlarging is advantageous rather than otherwise. Doubtless there must here be some confusion as to the value of terms. Other qualities being present—such as perfect gradation, in which are included softness and roundness—sharpness in an enlargement is a great advantage; and without the most perfect sharpness in the small picture intended to be enlarged the enlargement itself will, undoubtedly, lack that important quality. It does not at all follow that a transparency sharp in the highest degree is consequently hard, or will produce a hard enlargement; "sharpness" and "hardness" are not convertible terms. But at the same meeting at which Mr. Edwards expressed his opinion as to the value of a slight loss of sharpness Mr. William Brooks gave a bit of his personal experience, which challenges our preconceived ideas as to the possible and impossible in photography. A restless horse is photographed, and from such negative cannot be produced a direct enlargement sufficiently sharp to permit of a single hair being seen; but by first taking a very small transparency from the negative, and then obtaining from *it* an enlargement, every hair is distinctly visible. First of all, and somewhat contradictory of what appears on the face of the original statement, the photographic representation of the hairs must of course be present in the negative, or by no subsequent operation could they have been brought out in the enlargement. Secondly: if the hairs were rendered visible by one process of enlargement and not by another, it merely shows either that one process was better than the other or greater operative skill or experience was brought to bear on one than on the other. This, I opine, is the solution of the mystery, and is not by any means inconsistent with the explanatory statement made or suggested by a member that it might be a case of spirit photography, for I think it very possible that spirit agency may have had something to do with it. If the "Clachan Yill" could affect the normal control which the Scottish poet usually exercised over his optic axes, so that, when speaking of the moon, he says, indicating that his muse had become rather "elevated"—

To count her horns wi a' my power
I set mysel',
But whether she had three or four
I could na tell;

—if, I say, such "sma' drink" as the above-named beverage could produce such an effect, it is not illogical to suppose that a little of the colourless extractive principle of the fermented malt infusion would, if it reached the "noddle" *viâ* the stomach of a photographic operator, interfere, to some extent, with his power of delineating or focussing the ciliary filaments of a horse with sufficient sharpness to reproduce them in the enlarged pictures. Hence I rather favour the "spirit" hypothesis.

The various societies have been busy during the past month. What a very stormy scene there must have been at the "Parent Society," as the London Photographic Society is familiarly designated! The humorous letter of Mr. Sawyer, in which he so graphically describes the "shindy" which ensued upon THE BRITISH JOURNAL OF PHOTOGRAPHY being put in by way of proof that some official had been remiss in his duty, must have amused all who have read that gentleman's funny epistle. The "supreme moment" afforded a fine subject for the camera of a clever composition-photographer, by whom, out of the elements at his disposal, a great historical work might easily be produced. The principal figures in the pictorial sense might be the President and Secretary, taken at the moment when the presidential fist was in the act of coming down in such dangerous proximity to the Secretary's head as to cause the latter functionary to drop down "as if he had been shot." A few of the appalled members should come in as accessories, among whom we would look for the prime mover in this battle of words, whose face would naturally be made to assume something of a jubilant expression at having won the fight; a gallant member, whose courage carried him nobly through the Crimean war but ebbed down to speechlessness before a determined chairman; a member of an eminent firm, whose quiet determination was shown with overpowering effect; besides numerous other members from whose eyes the antagonistic feelings of *gaieté de cœur et abaissement* would be depicted. O, yes! it will make a grand historical work of art! I shall look for it on the walls of the next exhibition, if the Society ever be privileged to have another.

Talking of this Society's squabbles, I have to remark that if, as has been alleged by some members of the Council, all this dust has been raised by a *few malcontents* who have managed to make themselves heard and not by the general body of members, it is greatly to be lamented that the Council did not force them to realise how utterly insignificant they were by at once placing their own resignations in the hands of the members. By adopting this dignified course, the "malcontents" or "dustmen" might have received a heavy blow and great discouragement, by seeing the intense eagerness with which the great body of the members would rush forward for the purpose of immediately re-electing the self-deposed councilmen.

I, and doubtless many others, wait with some degree of anxiety for further particulars of the new method of colouring photographs so enthusiastically described by Mr. Sutton as combining vigour with softness, and exhibiting richness without gaudiness or vulgarity; and which is, moreover, to be very simple and cheap. What on earth can this new method be? Colouring processes of great pretensions have come to us from France before; but I do not find that any of them have taken root in this country. The most promising one was a process, about which a great deal was written some years ago, in which the picture was made translucent by means of wax, or some similar substance, and then painted on the back with strong body colours. A great noise was made about these pictures at the period of their introduction, and much inflated writing was indulged in by the newspaper press with respect to the revolution about to be effected in photography by the adoption of that system. But where is it now? Can any person give me a hint as to the way in which some of the cheap shop-window photographs are coloured? They look pretty, and from the low price at which they are offered it is evident they must be done by some very rapid process, not involving the application of high artistic skill. Has the once-vexed question concerning the permanence of certain aniline dyes when exposed to light ever been satisfactorily settled? These dyes, when mixed with a little gum water, and used, of course, in a highly-diluted form, answer well for colouring some kinds of photographs.

ADDRESS TO THE MEMBERS OF THE PHOTOGRAPHIC SOCIETY OF LONDON.

THE following address is in the course of circulation among the members of the London Photographic Society. It embraces the whole points of dispute, and the reason for the contemplated reforms in the above Society. It emanates directly from the active members who have taken the initiative in these proceedings:—

THAT deep-seated dissatisfaction exists among the members of this Society is an undeniable fact, and a considerable portion of the metropolitan members have, instead of retiring from the Society, practically formed an organisation to remedy the existing evils and to place the management of the Society on a broader and more satisfactory basis. It is felt that the period has arrived when this must be done, and the members who have commenced this movement, prior to action being taken, wish to place their views, as to reforms needed, before their fellow-members and to solicit their co-operation.

The chief cause of the present and past troubles of the Society is distinctly due to its constitution, which places its whole management in the hands of a practically self-elected, self-maintaining, and self-managing Council, the President of which, the present holder of the office declares, is "elected for ever." * Some of the members of the Council have continued themselves in office for many years, thereby reserving the exclusive management, and thus preventing other members, presumptively as well fitted, from sharing the duties and honours. In addition to this injustice, the interests of the Society have suffered by the prevention of that infusion of new blood into the management which is always advantageous. By this means, as well as by the introduction of personal friends, the prejudicial effect has been produced of separating the Coun-

* See Journal of the Society, December 12, 1872, p. 169.

cil from the bulk of the members and erecting a sort of *caste*. Hence has arisen an apathy among the rest of the Society injurious to its welfare.

During the continuance of this system the Society from having a balance in its favour of over £1,000 degenerated to the verge of bankruptcy, so that it was unable to pay the salary of its Secretary; its annual exhibitions had to be suspended, and its journal from being an important publication became that which it is now. By an infusion of popular energy the Society has recovered from its financial troubles, and this energy has now culminated in an earnest endeavour to abolish the causes which led to the decadence of the Society.

It must be remembered that the Council is not only entrusted with the general conduct of the business of the Society, but that it also is responsible for the production of the papers to be read at the meetings; for the contents and the conduct of the Society's journal; for the determining whether exhibitions shall be held, and the nature of such; for the hanging of the pictures in such exhibitions; for deciding whether medals shall be awarded, and the nature and classification of such medals; for the formation of the jury, which is always formed exclusively of the Council, who shall award the medals, and from whose decision there is no appeal whatever. When all these important matters are confided to this body, and especially as many of them are constant exhibitors and usually receive the chief medals, it is of the gravest importance that, having such heavy responsibilities, they should be elected in such a manner that not the faintest risk of unfairness should exist.

So far is this from being the case that the laws provide practically no safeguard whatever, but afford every opportunity for the exercise of favouritism. Nearly three-quarters of the Council always remain in office, and the remainder go annually through the form of retiring; but the members of this body have the power to determine, apart from the Society, who shall retire, and whether a part or the whole shall be re-elected. Both the temptation and the facility are thus provided, not only for the members of Council to remain in power themselves, but of ejecting those who may not agree with the ruling majority, and of replacing them by private friends.

The evils of favouritism which this system permits has, it is believed, for many years been taken full advantage of, so that the frequent charge that the Council was ruled by a "clique" has become a scandal. The general effect is shown in the fact that when members discover how things are managed they retire in disgust, and though new members constantly join and photography extends, yet the number of the members of the Society never permanently increases.

To remedy this disastrous condition the present movement is made. It is no use railing against the past or present rulers of the Society; the evils lie deeper—they exist in the laws that permit them.

The method by which these evils may be removed and the Society be restored to a healthy activity is mainly by the abolition of Laws V. and VII., which concentrate all the practical power of election in the hands of the Council, and by the substitution of other laws which will place the power in the hands of the members generally.

Much thought and careful consideration have been given as to how this undoubtedly just principle may be reduced to practice, so as to avoid the evils of the past, and to bring the executive power of the Society to such a degree of excellence as will place it above the suspicion of being influenced by any other purposes than those of the best interests of the Society, as well as of making it clear to the members that all its offices and all its honours are equally open; and further, that the most frequent change consistent with safe working shall take place, so as to cause a much larger number of members to share in the duties and honours of management.

The method by which it is believed this may be accomplished is by arranging that the officers of the Society shall be proposed and elected openly by the members; that they shall be elected to serve for a definite time, say three years; and that a certain proportion, say one-third, shall retire annually, and shall not be re-eligible for election until after the lapse of one year.

By this means there will be created each year vacancies for new members to share the duties and honours, who will impart that energy and freshness of thought that always accompanies new blood. There will also be provided a section of the Council always retiring into the body of ordinary members who are acquainted with the internal workings of the Society, and who by that knowledge will prevent the apathy that has previously existed. A constant stream of past and present officers will be circulating among the members, which must promote a prosperous activity in the Society. By the offices being equally open to all the members a healthy competition will exist, and only those will be elected who command the confidence of their fellow-members. Private influence, with all the evils that follow in its train, will be removed, and the members of Council will hold their seats by the honourable and unchallengeable authority of an open election.

One very important part of this plan is the rendering ineligible, until after the lapse of one year, of those who have served their term. Unless this be adopted there will be almost certainly a return to the old system of the same individuals remaining continuously in power. In all societies where this check does not exist an old office-bearer seems to acquire a superior right, and a new candidate is placed at a disadvantage. It is thought, as a general rule, that it will be better to reverse this, and to assume that a candidate who has not held office has a better claim than one who has already enjoyed the honour. A more enlarged means will thus exist of doing justice to all, and of preventing the offices being held by a small class. Occasionally it may appear inexpedient not to re-elect a good man, but the time will speedily come round when he can be replaced; and, after having served three years, it can be no great hardship to wait one year before beginning another term of years. But the plan must be looked at in its broad aspects and not in reference to isolated cases. The purpose of the rule is to prevent any one by length of service acquiring a right to hold office. The very opposite of this prevails in the present Council and constitutes one of its greatest evils; for, according to its practice, the longer a person is in office the greater right he feels he has to remain, and he imagines that he is aggrieved if an attempt be made to remove him.

It is proposed, however, that a member of Council shall be immediately eligible for Vice-President or President, without waiting the lapse of one year; and, as one of the Vice-Presidents is to go out of office annually, the retiring members of Council will furnish eligible candidates for the post. Any one so elected will thus have six years of continuous office—a period long enough, especially as after one year he may commence the same career again, to satisfy any reasonable ambition.

It is thought that it will be better, but perhaps not indispensable, to select the Vice-Presidents and President from the members of Council, as in serving that office they will have acquired a knowledge of the business of the Society to qualify them for the higher positions; these posts will also serve for recognition of superior merit, as well as rewards for past services.

The President, it is felt, should not be a permanent one, but that he should be elected for a definite term, and subject to the same condition as the other officers. This will permit the Society frequently to confer its highest honour on its most distinguished members, who being elected for a definite period will, on the expiration of the term, retire gracefully for the successor, without any semblance of being turned out. Great advantages are anticipated from this capacity of, from time to time, connecting the Society and its history with the distinguished men who directly or indirectly have become associated with photography.

Such is a brief sketch of the Amended Constitution that the reforming metropolitan members have agreed to, and which, without pledging themselves to exact details, they respectfully submit to their fellow-members.

It is proper to state that this reform movement has originated with one of the Vice-Presidents and a few other members of Council, who, seeing the abuses in the internal workings of the ruling section of the Council, were convinced that the Society never would be properly managed until the whole system was changed. A number of the private members were therefore communicated with, and a properly-signed requisition, according to Law VI., was sent to the Council to call a special meeting to consider the subject and to alter Laws V. and VII. But so obstructive were the majority of the Council that they not only ignored the requisition, which they were legally bound to obey, but they treated the few of their brethren on the Council who advocated the reform in such a manner that, from self-respect alone, they felt bound to resign their seats. A second requisition, more numerously signed, was then sent, and at the very last moment, after even the legal time has expired, the Council have appointed February 10th to consider the subject.

The members who have signed these requisitions earnestly appeal to their fellow-members for support at the forthcoming meeting in effecting these beneficial changes, and to prevent by any indirect means their efforts being foiled. As the future welfare of the Society will depend on the result of this meeting, there is little doubt that the members will largely assemble and emphatically express their desire for these long-delayed and greatly-needed reforms.

Contemporary Press.

TONING AND FIXING.

[Photographic Mosaics.]

From long experience and from comparison of work done years ago with work done at the present day, I am convinced that the toning and fixing solution in one bath, properly managed, produces better results than can be produced by two separate solutions, first toning and fixing afterwards.

The great advantages of the single bath are, in the first place, the facility and certainty of getting any desired tone; and, secondly, the superior brilliancy of prints when toned by this process.

The disadvantage formerly attributed to the single bath was the early decay or change of pictures when toned and fixed in it.

In the present mode of using this bath—that is, in the mode which I give further on—the advantages still remain, whilst the disadvantage is, or may be, entirely removed.

The disadvantages of toning in one bath and fixing in another are, firstly, uncertainty, with every change of the chloride of gold, in getting a given tone; secondly, bleaching of the prints by the gold solution itself, which bleaching *always destroys brilliancy;* and, finally, the necessity of detailing an operator to watch the operation.

My method is as follows:—1. The prints must be carefully washed in several waters, in order to remove all free nitrate of silver; for this purpose rain-water is to be recommended, for well-water generally contains both sulphates and carbonates of the alkaline earths, and these will precipitate the sulphate and carbonate of silver in the prints, which salts are not removed by washing but remain in the prints, and are not even removed in the fixing solution. It is to this circumstance, probably, that we may trace the specks that frequently used to appear on prints toned and fixed in the single bath.

Thus, then, it will be seen how necessary it is not only to wash the prints *well* before toning, but to wash them in *rain-water.*

Let them be *washed also in the dark or yellow room;* for if light can act on the prints whilst washing, the whites can never be made perfectly white by any amount of subsequent fixing.

When so washed the prints are thrown into the toning and fixing bath, which is prepared as follows:—

Toning and Fixing Bath.—Saturate a quart of rain-water with hyposulphite of soda, and then add to the solution the following preparation of gold.

Chloride of Gold.—Place in a small evaporating dish (of porcelain) ten leaves of gold (foil), and drop upon them twelve drops of hydrochloric acid and six drops of nitric acid; the compound acid will dissolve the gold. Holding the dish between your thumb and first finger, move it backwards and forwards over a spirit-flame until the chloride of gold is just quite dry, and *begins* to appear red. (If the dish be made too hot, the chloride will be decomposed; therefore be careful, and move the dish about, to avoid getting any one part too hot.)

Wash the chloride from the dish with the saturated solution of hyposulphite of soda. The toning and fixing bath is now ready. Immerse in this, as before said, the washed prints, see that there are no air-bubbles on their surface, and turn them round every now and then. The toning and fixing proceed slowly but surely. When the prints please your taste take them from this bath, wash them through a pail of water, then throw them into a bath of a saturated solution of common salt, and leave them in this for at least half-an-hour, turning them round occasionally. After this the prints are taken out and washed in the usual way; wash them well. You will now see that prints toned in this way are more vigorous and brilliant than when toned first and fixed afterwards.

The bath can be used repeatedly, taking care to add a little more hyposulphite of soda and chloride of gold each time you have to tone a fresh quantity of prints. When the bath is not in use, shake it frequently and expose it to the atmosphere; by this means any sulphuretted hydrogen gas that may be present in the solution will pass off and leave the bath ready for further use. After a time the edges of the dish holding the solution will be covered with a film of deposited gold and silver, which is obtained again for use in the following manner:—

Pour the solution into another dish, and then cover the deposited film with the mixed acids (hydrochloric and nitric) until it is entirely dissolved; then apply heat and evaporate to dryness. The residue is a mixture of chloride of gold and of chloride of silver; a little water will dissolve the gold salt, and the insoluble silver salt is left after decantation. The chloride of silver is then removed and added to the silver residues, whilst the chloride of gold is reserved for future use.

When the bath has been used a great many times it may, perhaps, be well to make an entirely new bath, and to throw down the silver and gold in the old bath by means of a current of sulphuretted hydrogen gas. The black precipitate is a mixture of sulphide of gold and of sulphide of silver. Wash it well, and then dissolve it in a mixture of hydrochloric acid and nitric acid, aided by heat, and evaporate the solution to dryness. You have now, as before, two salts—the chloride of gold and the chloride of silver—the former of which is soluble in water, the latter insoluble. Separate them, therefore, and use them according to instructions before given. J. Towler, M.D.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION

The monthly meeting of this Association was held on Tuesday evening, the 27th ult., at the Free Public Library, William Brown-street,—Mr. R. C. Johnson in the chair.

The minutes of the last meeting were read and confirmed, and the newly-elected President, Mr. P. Mawdsley, then entered on the duties of his office.

The President apologised to the members for not having prepared for them the usual address, but, as there was sufficient business for the evening, no doubt they would excuse him.

The Rev. Usher B. Miles was elected a member of the Association.

A vote of thanks was passed to Mr. G. W. Wilson, of Aberdeen, for his kindness in lending his negative, *The Path by the Loch,* for the purpose of an autotype enlargement for the presentation print.

Mr. H. Greenwood sent for inspection some exceedingly-interesting specimens of minute Dallastype printing, and an extract from a communication received by him from Mr. J. T. Taylor, one of the editors of The British Journal of Photography, explanatory of the method by which he (Mr. Taylor) had obtained similar results, was read by the Secretary.

Mr. J. A. Forrest presented to the Association a pair of Edwards's combination printing-frames, for which he received a hearty vote of thanks. He (Mr. Forrest) thought that the Association should possess a variety of apparatus, &c., for the use of the members, especially such things as all might be disposed to use occasionally, but which, by reason of their being too costly, individual members did not care to purchase for themselves.

After some discussion the Council were requested to take the matter into consideratton.

Mr. W. Harding Warner then exhibited and explained the method of using his ingenious camera tripod stand, with the additions for copying, &c. The stand was examined with much interest, Mr. Warner kindly giving all information respecting it, so that several of the members might have similar ones made for themselves. He (Mr. Warner) mentioned that in taking interiors there was often a difficulty in preventing the legs of the tripod from slipping on the polished marble pavement; but by inserting the points of the tripod in three common bungs this danger was avoided.

Mr. O. R. Green presented to the Society's album a number of beautiful views which he had collected in America. Many of them had been taken by Mr. E. Wallace, jun., Secretary of the Philadelphia Photographic Society, and some by Mr. Jackson, photographer to the U.S. Government Expedition to Colorado.

Mr. Atkins exhibited a number of transparencies for the stereoscope, and an enlargement on opal glass, taken by the new "emulsion-without-washing" process, invented by Mr. W. B. Bolton. Each plate had been timed from instantaneous to six seconds' exposure, and the results gave evidence of the rapidity and excellence of the process. The transparencies were remarkably clean, and free from spots or pinholes. Mr. Atkins said he had seen Mr. Bolton prepare and dry twelve stereo. plates in seventeen minutes.

After some remarks in their favour by the President, a desire was expressed that some negatives should be obtained by the process, and exhibited at the next meeting.

Mr. O. R. Green's prizes were awarded to Mr. A. Tyrer for the best six 12 × 10 dry-plate negatives, and to the Rev. J. D. Riley for the best twelve negatives, size 8 × 5 and under. All the negatives were taken by the collodio-bromide process. Mr. Keith and Mr. Warner acted as judges.

The President developed before the members two negatives by the gelatino-bromide process; and the meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A meeting of this Society was held on the 9th ult.,—M. Balard (of the Institute), President of the Society, occupied the chair.

After the usual preliminaries, the Chairman read a letter from the Librarian of the Industrial Scientific Society of Marseilles, asking the Society to accept a copy of its *Bulletin,* published quarterly, and pointing out that from the variety of productions carried on at Marseilles, the subjects of interest contained in the reports of the Society's meetings were varied, and likely to prove interesting to photographers. The Secretary then went through the correspondence of the month.

M. Clavier, of Alger, stated a formula for a dry collodion process, which enabled him by means of one of Darlot's globe lenses, fitted with a diaphragm of eight millimetres, to obtain views of monuments well lighted in twenty or thirty seconds; of landscapes with verdure predominating in forty to sixty seconds; and of the interiors of houses in ten minutes, which it would have required him a quarter of an hour to obtain on the tannin plates. The clean glass was coated with a preliminary layer of thin albumen, consisting of about the white of one egg to a litre of water (about one pint and three-quarters). After this had dried the plate was collodionised with the following collodion:—

Alcohol at 40°	1 ounce 6 drachms.
Ether at 62°	2 ounces 2 ,,
Gun cotton	15 to 17 grains.
Iodide of cadmium	4 ,,
,, ammonium	4 ,,
Bromide of cadmium	8 ,,
Solution No. 1	33 minims.

This solution No. 1 was made by dissolving in a beaker on a hot sand bath forty-five grains of white or yellow wax in an ounce of alcohol at 40°. After cooling a further ounce of alcohol was added, the mixture shaken and filtered. There was then dissolved in it a drachm of colophane, *i.e.,* resin. The plate coated with this compound was sensitised in a silver bath of the strength of 8 to the 100 slightly acid; it was then washed carefully and coated with a solution of tannin 1 to the 100. Thus prepared the glasses would keep a long time without any impairing of their sensitiveness. The images were developed in the ordinary way.

M. de Constant Delessert had sent two photographs to M. Davanne, along with a letter asking him if he had seen that in England and Germany there was at that time an epidemic in photography. It had got a sort of potato disease of yellow spots and surface defects which showed themselves when the prints were mounted, and often caused the loss of entire batches of prints, and which also could not be rejected till finished. Mr. Simpson had written an article on the subject, and the societies had discussed it without, in M. de Constant's opinion, any of them getting at the root of the matter. He had never experienced this phenomenon, but his successor at a former studio of his was beset by it. It showed itself with various papers and at different times. Sometimes only two or three showed any taint—sometimes a whole day's printing; and the spots appeared ordinarily on the whites of the paper. He conjectured that it was in some way due to the *dust* floating about the place, for the spots had a centre from which the mischief worked, and he wished the Society to pronounce upon the point. The print sent was carefully examined by the members present.

M. Franck de Villecholle remarked that the question had been before the Society in 1872, and he had then stated, if not the cause of the spots, at least the means of avoiding them, which means consisted in drying the prints rapidly after mounting. The spots were produced only when the prints lay a long time damp, and susceptible to whatever influences might attack the image.

The Chairman said that they were not produced in all places with the same strength and persistence, and they might set them down as spores, of a nature not yet determined, which were deposited on the paper. Once there, and the albumen and gum being moist, they developed themselves, and produced a sort of mouldiness which caused the accidents pointed out by M. de Constant. It was therefore a question for microscopic science to solve.

M. Franck thought the explanation of the Chairman probably a true one, for an *employé* of M. Covette had just told him that this accident never happened if he added to the paste used a certain quantity of alum. Probably any other antiseptic substance—such as phenic acid, creosote, &c.—would have the same effect.

M. Perrot de Chameux (the Secretary) then read a long letter from M. Vidal, in which that gentleman pointed out a new method of shortening exposure. The subject had already been indicated by M. Melchion in the *Moniteur* for December, and we need only briefly indicate the subject here. Invited by M. Melchion M. Vidal attended some experiments, during which a complete negative was obtained in eight seconds' exposure under conditions detailed in our report of the meeting of the Photographic Society of Marseilles. After the letter had been read,

M. Gobert said that the idea was not new, although it might not have become matter of practice. It had escaped him who the author of the idea was and when it was published, but if he were not mistaken it went under the name of "molecular concussion" (*ébranlement moléculaire.*)

M. Liebert declared that he had tried the plan as first indicated by M. Melchion—that is to say, without the second immersion in the silver bath. He had adapted an "obturator" of ground glass to the tube of the lens, the ground side inwards, and could state that a preliminary exposure of one or two seconds diminished the exposure by one-half; and it was equally so whether the "obturation" took place before or after the normal exposure.

M. Franck had also tried this process, and it was his opinion that in the dull weather with which we have been afflicted it would be impossible to work without it. Only he was not in accord with M. Liebert as to the fact of identity of result whether the *éclairage*—to use the *atelier* phrase for the operation—takes place before or after exposure. Whenever he had "lightened" the plate thus *after* exposure on the sitter the image had been flatter. That might depend upon the character of the studio light, but with him it was a constant effect. He equally found it disadvantageous to open the objective over its entire diameter, and found the effect better when it was only opened about half. This was how he operated:—He made an obturator of pasteboard pierced with an aperture, of which the diameter was half that of the lens. That opening was closed, not by a piece of ground glass, as indicated by M. Melchion, but with an opal glass. The light was thus sifted—divided in a much finer way; was much more soft than when ground glass was used, and the "lightening" might be further prolonged if necessary. The opening was closed by a morsel of cardboard turning on a pivot, like the diaphragms of certain landscape lenses. He (M. Franck) also said that the focal length of the lens, and consequently the distance between it and the sitter, had an influence on the duration of the *éclairage*.

Mr. W. H. Stillman said that they used green glass in England.

M. Franck thought that good results might be got by those who devoted themselves to the reproduction of paintings if they induced the molecular motion by preliminary exposure under divers-coloured glasses. He meant to try the experiment of exposing on the sitter and illuminating with diffused light at the same moment, by making the latter enter through an opal slide placed in a hole in the front of the camera.

M. Chardon remarked that the supplementary bath mentioned by M. Vidal appeared only to have the effect of producing a denser image.

M. Franck thought that might be, but, at the same time, it would have the effect of abridging considerably the time of exposure, which was the chief end at which M. Melchion aimed.

Several members, while recognising the new prominence which had been given to the subject by M. Melchion, desired that a *résumé* of the history of the idea might be published in the *Bulletin*, and in consequence of that desire the Chairman requested the Secretary to make the necessary investigations.

The meeting then passed in review the topics recently touched upon in foreign journals, the Secretary, in doing so, detailing the aim and nature of the Crawshay prizes amongst other matters. The review was closed by a description of Herr Eckert's (of Prague) process of phototypie.

M. Ferrier, in relation thereto, said that if he had known it to be a matter of chromolithography he would have brought some prints of M. Marie's, the Paris lithographer, who had practised that process for a long time, and some samples of whose colour work he had shown the Society some years ago. He would, however, bring some next time.

Mr. Stillman presented some fine positives and negatives obtained by the collodio-bromide emulsion process, and placed two bottles of his emulsion at the disposal of the members. It was a collodio-bromide—one sample being made with gun cotton and the other with paper. A description of the method of preparation was given by Mr. Stillman, which we need not recapitulate here, and for which, as well as for his presentation, the Society thanked him.

M. Ferrier said that he had tried the Liverpool dry plates which Mr. Stillman had been good enough to send them previously, and the results had been far from satisfactory. They were a half less rapid than Taupenôt plates, as the examples before them would prove, and moreover exhibited a rough structure and striæ, which had a most disagreeable effect.

Mr. Stillman, having examined them, said that in all his experience he had never found the like.

M. Rodriguez, of Lisbon, sent some specimens of photolithography to the Society, consisting of reproductions of engravings, coins, &c. It appeared that M. Rodriguez claimed to have invented a new process, and along with the prints he had sent a letter containing a description thereof, which letter he wished to be deposited, unopened, in the archives of the Photographic Society of France till the convenient season for publishing it arrived. He thus hoped to secure priority of invention. The Society complied with his request, and admired his specimens.

M. Gobert in the name of M. Vidal, exhibited some samples of that gentleman's polychromy, which were also admired, and M. Vidal was congratulated on the evident progress he was making.

A communication of M. de St. Florent on heliochromy was postponed till a future meeting, there being no time then to enter upon the discussion of a subject so interesting.

M. Franck presented to the Society a new press for stamping cameo photographs, constructed by M. Pietkieviez. In place of giving a convex bulge to the photograph, the part which held the image was raised and a bevel formed round it, which produced a very pretty effect.

A similar machine was shown by M. Wagner, which gave a "goffered" effect to the card by the convexity produced on a thick fold of caoutchouc through the pressure of a rim of iron. It was distinguished from those now in use by its power of "goffering" several prints at a time, and by its adaptability by means of different-sized rims to various sizes of photographs.

Both gentlemen were thanked for their presentations.

The Chairman announced that the selection from the archives of the Society had come back safely from Vienna, and proposed that the frame containing them should be exhibited at the forthcoming exhibition of the Society in May.

This being agreed to the business of the evening was exhausted, and the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on November 21st last, when Dr. Vogel occupied the chair, and, after some speculative observations by several members as to the probable consumption of silver and gold per sheet of paper,

The Chairman laid before the meeting a letter from Baron des Granges relative to some excellent negatives he had taken at Venice and Florence. These negatives derived their special interest from the fact of their being taken with Steinheil's new so-called wide-angle lens. In order to show its working capacity better the Baron had sent along with these negatives some pictures taken with the old aplanatic from the same standpoint. On comparing the results in this way it was at once apparent how much wider a field the wide-angle lens embraced, as also its freedom from distortion and the great equality in the lighting from centre to edge of the plate. No flare was visible. The Baron used two of these lenses of the aperture of nine and twelve lines respectively for 12 × 16 plates, according as he had much or little space to work in. He could get a good picture, embracing an angle of sixty degrees, without any stops. The aplanatic was, however, more rapid with the full aperture than the other; but it required to be so stopped down in landscape work that, after all, the difference did not amount to much.

Some remarks were then made on Stein's heliopictur, *apropos* of a letter which he sent on the subject in reply to Herr Prümm's criticism. In this letter Dr. Stein contradicted the statement which made him merely a copyist of an older invention of Dubroni's. He declared that there was nothing in common between the two, and entered into details of the differences between them, which, as they would not have much interest for our readers, we need not repeat.

His letter was answered by Herr Prümm at equal length, establishing the identity in principle and construction of the main specialities of the two inventions, and altogether there appears to have been a very pretty quarrel over the subject. A great many members took part in the discussion, which was finally adjourned to the next meeting in order to give Herr Prümm an opportunity of bringing forward a Dubroni apparatus for the purpose of comparison.

There was no other business of any importance, so the meeting was adjourned.

Correspondence.

PRINTING IN FATTY INK WITHOUT A PRESS.—PHOTOCHROMOLITHOGRAPHY.—YELLOW SPOTS ON SILVER PRINTS.

A CURIOUS new process of printing photographs in fatty ink, without a press, has just been published in a German periodical, of which I forbear to give the name, out of consideration for both printers and readers, so perplexing is the orthography. The process is due to M. Richard Jacobsen, and is as follows :—

A proof is first printed in carbon upon glass by the known method. The glass plate is then fitted into a wooden frame in such a way as to form a dish which will hold a solution of gelatine to be presently poured into it.

This solution is made thus :—

Gelatine	1 part.
Gum arabic	1 ,,
Glycerine	2 parts.

It is poured upon the carbon image whilst still warm, and when cold becomes the film from which prints are to be pulled. When sufficiently cold the film is cut away from the glass and frame, and its face bearing the image is placed upwards.

The printing from this film is then effected in the following manner :— Some printing ink, diluted with turpentine or benzole, is poured upon an elastic tablet, and worked to the proper degree by means of a ground-glass roller. When this has been properly charged with ink the carbon image is rolled with it in the ordinary way, backwards and forwards in all directions.

A sheet of plain albumenised paper, not coagulated, is then laid upon the inked film, and pressed into contact with it by means of a squeegee. It is then removed with care. This sheet of paper absorbs the moisture, and ought not, therefore, to be left long in contact with the film. It is not necessary to moisten the plate with water, for the film itself contains as much as is necessary for a dozen proofs. After that number has been pulled upon the albumenised papers the film must be left for a couple of hours to absorb more moisture from the atmosphere, after which another dozen proofs may be taken from it, and so on. The image in this process always remains in good relief upon the film.

By this process one can print upon objects with a curved surface—bottles, vases, &c. ; and by using vitrifiable colours the image may afterwards be burnt in.

The above details are rather meagre, but I imagine that the process is only suitable for subjects in lines and dots, and not for those which exhibit half-tone.

M. Eckert, of Prague, has published, in a recent number of the *Photographische Correspondenz*, a specimen printed in colours by photochromolithography, from which it appears that his method is still open to improvement. It appears to be very similar to that of M. Laroche, of Constantinople.

M. Ferrier states that prints of this kind were done by M. Marie, the well-known photolithographer in Paris, many years ago, some of which were actually shown at an exhibition of the Photographic Society of France, and that he has employed the process ever since. The process has, in fact, now passed from the limbo of experiment into the domain of industry.

I have a few more words to add to my account given in my last letter of the proceedings at the meeting of the French Society on the 9th inst.

It appears that M. Melchion not only exposes his plates in the camera for two seconds to diffused light which has passed through a piece of ground glass held before the lens, but dips them into a fifty-grain nitrate bath before pouring on the developer. His exposures are thereby reduced to one-half. Some leading members of the Society have already tried the plan, and succeeded with it.

At the meeting in question some prints were exhibited which had been sent from M. de Constant Delessert, and which showed some ugly yellow spots. That gentleman finds that certain *ateliers* are likely to produce this trouble, whilst others are free from it. M. Balard, the learned President, suggested that the cause might be germs in the atmosphere of the spot-bringing localities, which settle upon the print and develope their evil influences, pretty much in the same way as a germ of cholera, typhus, or small-pox in an unhealthy district may get into the system of an unfortunate inhabitant. Nothing is more probable, and the moral is, evidently, when your prints are spotted from this cause, not only to remove your *atelier*, but yourself and all your belongings, and "make tracks," as the Yankees say.

M. Clavier, a photographer at Algiers, adds wax to his bromo-iodised collodion in the tannin dry process, and finds an advantage in it. The wax is dissolved in alcohol, along with a little resin, and then added to the collodion. The nature of the supposed good it does is not stated. His plates receive a preliminary coating of albumen, and a five-grain preservative of tannin.

I have not yet received M. Vidal's promised specimens, alluded to in my last.

I cannot conclude this communication without referring to THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1874, and expressing my admiration of the little Woodburytype with which it is illustrated, as well as of the mass of interesting and instructive matter with which its pages are filled. We are all greatly privileged in being able to procure such a volume for a sum almost nominal. No *great* artist undervalues photography; for the humblest photograph he knows well enough may teach him a lesson. But there is a class of *tenth*-rate artists who affect to despise our art; when such cross our path we may show them the illustration to our ALMANAC, and ask them in return to show us something better in monochrome by their method. It is a beautiful example of the present state of photography; but we must do even better than that yet. We must introduce the charm of colour into our works, but without hiding the details. THOMAS SUTTON, B.A.

Redon, January 30, 1874.

"HEADS AND FACES."

To the EDITORS.

GENTLEMEN,—In your issue of the 23rd ult., under the above heading, it is reported that a gentleman, at a recent meeting of the South London Photographic Society, stated in effect that *every artist knew* that the due proportion of the "human form divine" (male) was ten heads. Now I think this certainly wrong.

I believe it has been generally conceded among figure-painters and sculptors that even the Greeks took, as the "heroic" standard, eight heads, and that was rather an exaggeration in actual measurements from the finest specimens of real life, the proportions seldom reaching more than seven and a-half. This will be found in Haydon's lectures, and, however eccentric that artist may have been, a canon of his on such a point would be readily accepted.

In my own experience, when a student (and I measured carefully wherever opportunity offered from the best living models, and also from diligent comparison of notes from many contemporaries), I never found a figure up to the Greek standard, but usually less than seven and a-half, and that of female models under seven.

As to the size of the *face:* from numberless measurements I should be inclined to assume as the average of "life-size" for a male about eight inches, measuring from the top of the forehead to the tip of the chin, though subject, of course, to many individual variations, which would bring the *head* to about the size insisted on in the above-named article.

Of late years, having had to deal considerably with enlargements to life-size for painting, when having the advantage of being able to measure, it has surprised me to meet with numerous instances where the dimensions of the female face exceeded those of the male, though the whole figure would be considerably less.

Assured that you will deem every conscientious effort made towards enforcing truth worth notice—I am, yours, &c., A. P. CHAMBERS.

211, *Clapham Road, S. W., January* 30, 1874.

To the EDITORS.

GENTLEMEN,—Your comments upon what I did *not* say at the South London Photographic Society did not catch my eye in time for an answer last week. The letter of my friend Mr. Hubbard, that of "Plano-Convex," and your own notes in the Journal of the 30th ult., render it quite unnecessary for me to say anything upon that part of the subject, except to thank you for your very handsome *amende*.

As I am to read a paper upon a kindred matter at the next meeting of the Society, and purpose saying a few words more upon the subject of the Crawshay heads, I will not trouble you with any further remarks, except to draw your attention to the coincidence of your own measurements of the male head and those of your correspondents, as giving a size not generally exceeding nine inches for the head and seven for the face. This entirely coincides with my own experience, which, in painting life-sized heads, has been extensive. It is only a matter of an inch that I am contending for—a very trifling matter, apparently; but add that inch to a man's nose and his best friends will fail to recognise him.—I am, yours, &c., R. W. ALDRIDGE.

221, *Cornwall-road, Notting-hill, W.,*
February 2, 1874.

ANSWERS TO CORRESPONDENTS.

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

HELSBY & Co.—The name was correctly entered in the Registrar's books.

G. B. PRINCE.—There is no necessity whatever for using patent plate. Good flatted crown glass will answer your purpose quite as well.

G. H. PRESTON (60, Market Street, Manchester).—This correspondent would feel obliged for any information as to the whereabouts of the negatives taken by Mr. Saxon at the above address some years ago.

S. S.—We cannot advise the adoption of any other formula for printing and toning in preference to that at present in use by you. If you do not obtain satisfactory pictures you must look for the cause elsewhere than in the formula.

B. R.—In a lens of flint glass there will be a greater distance between the visual and actinic foci than if the lens be made of crown glass. In the former the difference is fully one part in thirty; but in the case of the latter it will be only one part in about fifty.

X. Y. Z.—You are not singular in your experience of the unreliability of argentometers. We have two, both of which were "warranted;" but neither of them will correctly indicate the strength of a solution of nitrate of silver within five or six grains to the ounce.

C. W.—1. We are entirely of your opinion that twenty seconds is a very long time to wait before a well-exposed negative begins to make its appearance under the stimulating action of your iron developer. This tardiness can only be accounted for on the supposition that the developer was either too weak or contained too large a proportion of a restraining agent. Operating at too low a temperature will also induce slowness in the developing.—2. If the chemicals are in good condition, you need not entertain any fear of fogging within reasonable limits as to time.

PRINTING IN COLOURS.—Mr. F. J. Duck offers the following suggestion for producing a pigment print in colours:—"A piece of mica is spread upon the negative, turned over the edge, and fastened at the back to keep it in its place; then the various colours of the view are spread upon the top of the mica in their proper places, and, when dry, exposed to light through the negative long enough to obtain a print. It may then be developed with warm water. The pigments are mixed with gelatine and bichromate of potassium.

AMATEUR.—It is a recognised fact that a cold solution of nitrate of silver holds in solution a larger quantity of iodide of silver than a silver solution at a higher temperature. In consequence of this, if a bath which is saturated with iodide at the ordinary temperature be warmed, it will become turbid from its inability to retain in solution all the iodide, a portion of which, when thus liberated, renders the previously clear solution very turbid. It is no uncommon thing for a bath which is quite limpid in the morning of a summer's day to deposit iodide after the atmosphere has become warmed by the sun.

F. J. W. (Welwyn).—1. The development of the negative will be rendered quite manageable by adding to a fifteen-grain solution of iron from twenty to thirty minims of glacial acetic acid. If you do not, after this addition, find the developer flow smoothly over the plate, add from ten to fifteen minims of alcohol to each ounce.—2. With a *good* negative you may print either in sunshine or shade. If the negative be thin and feeble, the shade is to be preferred; but if, on the contrary, the negative be very patchy and intense, it is best to print in the sun. We should advise you to obtain a good negative from a professional photographer as a standard, that you may know what to work up to.

A. W. BEER.—1. The best method, with which we are acquainted, of removing albumenised paper which has unfortunately attached itself to the negative through being printed upon before it was thoroughly dry, is to adopt the well-known school-boy's expedient of thinning paper, viz., to wet the finger and rub it upon the paper until the latter has been all peeled off Avoid hurry, or too great friction, in this operation; and, by care, every particle of paper may be removed from the negative. If the varnish has been good the negative will be none the worse.—2. Methylated alcohol of the strength of 64 over-proof may be obtained in most large towns at about five shillings per gallon. Of course the price, like the strength, is subject to variation according to local circumstances; but at whatever price it may be obtained, the *strength* may be considerably increased by adding to the spirit some pulverised and well-dried carbonate of potash, shaking this up at frequent intervals. The potash robs the spirit of a great proportion of its water, which sinks to the bottom.

DELTA.—At first we concluded that the ground-glass appearance of the varnished negatives was owing to the varnish having been chilled when it was applied; but, from a trial of the sample sent, we now perceive that you have been using a varnish specially prepared to imitate ground glass.

A. A. (Dunbar).—The small sample of carbon tissue enclosed is quite good—at anyrate, the gelatine is not insoluble. We don't clearly understand from your letter the way in which you have been conducting the experiment, but suggest that you should send us a sample of both the tissue and the transfer paper of sufficient dimensions to enable us to make two or three trial pictures. The result of these trials we shall communicate. The following is an outline of the process of carbon printing by single transfer:—Sensitise and dry the tissue, carefully avoiding exposure to light; print under the negative; immerse the tissue and the transfer paper in cold water for a short time until they become quite flaccid, then bring the respective surfaces in contact while in the water, removing the pair upon a metal or glass plate, and applying pressure with a "squeegee" until the water is removed. After five or ten minutes, plunge them in water of the temperature of 90° to 100° Fahr., and in a few minutes separate the two sheets, throwing away the now worthless tissue. By the continued action of the warm water, with agitation, the picture will be developed upon the *transfer* paper.

"MARK OUTE."—Received. In our next.

PHOTOGRAPHIC SOCIETY OF LONDON.—The annual general meeting of this Society will be held on Tuesday next, the 10th inst., at 8 p.m., when the report of the Council and the election of officers and council for the ensuing year will be proceeded with. Mr. Jabez Hughes will move that a committee be appointed to revise the laws of the Society. Balloting-papers will be forwarded in a few days to all members of the Society who have paid their subscriptions for the current year, so that every *bonâ fide* member may be enabled to vote at the election of officers and council. The balloting-papers must be properly filled up, and brought to the meeting personally. Members who have not paid their annual subscriptions are earnestly requested to do so without delay to Mr. S. Davenport, Society of Arts, Adelphi, London, W.C.—H. BADEN PRITCHARD, *Hon. Sec.*

THE PROGRESS OF THE GELATINE PROCESS.—We have received from Mr. Kennett a sample of sensitive gelatine prepared in the manner indicated when we explained the nature of the patent obtained by that gentleman, and which, we may remind our readers, consists in mixing the gelatine and bromide of silver in the correct proportions for successful working. From this the water is evaporated, leaving the sensitised gelatine in the form of a hard, dry pellicle, which is then cut up in small pieces like isinglass, and put up in opaque packages ready for use at any time. To use this gelatine, all that is required is to place the contents of a packet in a bottle containing the required portion of water, say two ounces, and, after allowing time for it to swell, immerse the bottle in warm water, when the sensitised gelatine is liquefied, and may then be poured upon the glass plates. We have also received from Mr. Kennett some very charming examples of transparency printing on his gelatine films. The great range and variety of tones which may be obtbined show that the finest efforts of the best continental albumen artists can be successfully rivalled by gelatine. These pictures may be seen at our publishing office.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 10	London (Annual Meeting)	9, Conduit Street, Regent Street.
" 12	South London	John Street, Adelphi.
" 12	Manchester	Memorial Hall, Albert-square.

METEOROLOGICAL REPORT,

For the Week ending February 4, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain fall.
29	30·44	WNW	44	45	46	44	—
30	30·40	NW	41	46	48	42	—
31	30·45	NW	35	36	49	34	—
Feb.							
2	30·42	WNW	41	45	45	43	—
3	30·41	WNW	40	41	47	40	—
4	30·64	N	35	37	—	35	—

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 719. Vol. XXI.—FEBRUARY 13, 1874.

RECONSTRUCTION OF THE LONDON PHOTOGRAPHIC SOCIETY.

The contest which has for some time been going on in the London Photographic Society has now been terminated, and the victory rests, as we always anticipated it would, with the reforming section of the members. Ample notice of last Tuesday's meeting was given, and, by the discussion of the subject in the "mere commercial" publications, the issues were fairly placed, not only before the members, but the whole photographic community.

By the acknowledgment of the Council that reforms were desirable the question was narrowed into the small compass of how they should be effected and in what they should consist. Both parties were agreed that a committee should be appointed to revise the laws; but an important difference arose between the two parties as to how the committee should be appointed, and what the leading principles should be to guide the committee in doing its work. The requisitionists contended for those contained in the newly-proposed laws—the nomination and election of officers openly by the members, and not by the nomination of the Council; the offices to be held for a definite term; and the ineligibility of officers for re-election until after the lapse of one year.

The Council did not state what their definite programme was, but mysteriously hinted at something else on a much broader basis than this. Whatever their exact views were they did not state them, but it might be gathered that they still retained their love for the old council-nomination or "house-list" system. If they had any precise scheme they ought to have presented it at the meeting so that the members might contrast it with the one which they had compelled the opposition to propound. If they had one at all it must have been contained in a "sealed packet," only to be opened in secret committee instead of being discussed in public meeting. A clear line was therefore drawn, and the meeting, by a distinct majority, preferred to appoint a committee with fixed general principles to guide them, rather than to set them to do their work in the dark. The amendment of the Council—which was no amendment at all, but only a simple negation—was, therefore, rejected, and the new laws, as a basis for a new constitution, were accepted.

The President and Council appeared to be prepared for this action, and, interpreting it into a vote of want of confidence, immediately resigned. The members were, however, taken by surprise; but, rather than stultify themselves by retracting their vote, accepted the resignations. Such a crisis is fortunately very rare, if not unique, in photographic societies; but we cannot see how either of the parties could have acted otherwise than they did. There was really, under the circumstances, no middle course for either to adopt. It was a mistake to describe it as a "storm in a teapot;" it was a real battle of different principles in conducting the Society. The fundamental differences were rather felt than expressed, but the meeting thoroughly understood them. We do not see how the President and Council, after the hostility they had exhibited, could honourably have retained their seats; and, much as we may regret the result, we feel sure that they acted as all English gentlemen would act under similar circumstances.

That the dissatisfaction was deep and not superficial we think events have proved; but it was better at once to "have it out" than to let the rancour exist. Although the discussion was warm and excited, as must always be the case when men are really in earnest, yet it is gratifying to record that it was without personal acrimony. There was much plain speaking and hard hitting on both sides, yet none lost temper. The matter terminated in such a manner that, when temporary excitement has abated, the members may cordially meet and discuss the topics which usually engage their attention.

In the course of the discussion one fact came out clearly—for its importance was admitted on all sides—that in future country members must have the same privilege in voting for the election of officers as those in London. In the original programme of the reformers this formed a definite part, even to the extent of admitting proxies; yet as this was open to the charge of leading to abuses, it was deemed proper to first secure the right of open voting to town members, and afterwards to see how it could best be extended to country ones. The march of reform has, however, been so rapid that it is now distinctly admitted that country members must, equally with the metropolitan ones, be provided for in voting in connection with the annual elections. This alone will communicate a new interest to distant members, and will be a fresh bond of union in the Society.

When party feeling runs strong there is a great temptation to indulge in personality. In this dispute neither party has had recourse to it, and this redounds to the credit of both. On one point all have from first to last agreed—that it was for the good of the Society that all were struggling. While this feeling remains the healing influence of time and mutual forbearance will speedily restore the interrupted harmony.

We trust that, when the new laws have been agreed upon and a new executive has been elected on a broad basis, the Society will start on a fresh and more extended career of usefulness.

TEST FOR HYPOSULPHITE OF SODA.

We are not aware that the following test for hyposulphite of soda in the water employed for completing the washing of silver prints has been published; but, as we have the assurance of a practical printer of lengthened experience as to its reliability, we publish it for the information of our readers.

When the washing of a batch of prints is supposed to be complete, a quantity—say about a pint—of the washing water employed is drawn off and placed in a common *white* jar (a clean jelly-pot answering well for the purpose), and a *single drop* of a very strong solution of nitrate of silver—say one hundred grains to the ounce—is dropped into the centre of it. This heavy solution falls through the water, forming chloride of silver with any soluble chloride which may exist in the water, and necessarily a similarly-insoluble precipitate with any other salt present in the water under examination. This precipitate will be produced in a white, opalescent, cloud-like form as the silver solution descends into the liquid, and will remain of this colour if *absolutely* free from hyposulphite. If, however, the *merest trace* of the latter salt be present the opalescent deposit, instead of remaining perfectly white (the absence of any salt, such as chromate of potash, which would cause a chocolate-coloured precipitate, being assumed, of which the colour of the water would at once furnish evidence), will, in the course of two or three seconds, become blackened in colour, the amount of discolouration depending upon the quantity of hyposulphite remaining in the solution—ranging from a faint fawn colour, when the merest trace exists, to an intense black, passing through the intermediate stages of yellow and brown if the amount be considerable.

So delicate is this test that one part of hyposulphite of soda in 100,000 of water is said to be readily detected by it. To those, therefore, who are engaged in the printing of photographs in silver this hint may be interesting and instructive.

All that is necessary to ascertain if a batch of prints be sufficiently washed will be, after having taken care to have them moved freely about in the washing water, to draw off half-a-pint or a pint of it into a clean white jar, and to drop a single drop of strong silver solution into it, taking care not to have the liquid agitated more than can be helped. The silver solution will fall to the bottom of the fluid, causing an opalescent cloud, which, if free from hyposulphite of soda, will remain perfectly white; while, if the slightest trace of hyposulphite be present, it will speedily assume a darkened tint, the depth of colour depending upon the amount present in the water under examination.

Several tests have been proposed for the purpose of detecting hyposulphite of soda in small quantities—such as iodine, which is decolourised by it, and proto-nitrate of mercury, which causes a dense brown precipitate with it; but we are not aware that any test has the delicacy which is possessed by the method now indicated. It also has this recommendation—that the test employed is a solution of a substance always at hand in the laboratory of the photographer, whether his practice be large or small; and it does not add to the number of the chemicals he will have to provide.

PRINTING WITH SALTS OF IRON.

We now bring to a conclusion our remarks on this subject commenced in our issue of last week.

First of all, in order to dispel erroneous ideas which some may entertain with regard to the exact part which iron plays in the method of printing described, we must state that, as regards the development of a ferric picture by the salts of silver, the iron acts merely as a reducer or developer. What really takes place will be at once understood from the following considerations, which, in order to the greater simplification of the subject, we confine to silver.

The *proto*salts of iron reduce silver, or, in other words, are developers; the *per*salts of iron do not act in this way. But, at least in such instances as have come under our observation, the persalts of iron are converted into protosalts by the action of light; and, this being the case, a paper that has been washed over by a persalt and exposed under a negative becomes converted into a protosalt precisely to the extent to which the light has acted upon it. Some portions, therefore, of that paper are impregnated with the protosalts, which reduce silver; others are only coated with the persalts, which have no action upon the argentic salts. If a wash of silver be applied to paper in this condition what is the result? Simply this—that in those places where the light acted and converted the persalt into a protosalt the silver is reduced, the reduction being in proportion to the conversion of the persalts to the protosalts. As the picture is formed by the reduced silver, it is evidently folly to designate such a picture by the name of "ferrotype," because the iron has only acted as a reducer of the silver, which metal forms the picture; and the picture is thus an argentotype, not a ferrotype. These remarks apply with equal force to pictures produced by the salts of uranium. Previous to exposure to light nitrate of uranium, when applied to paper, has no action upon nitrate of silver and various other reagents; after exposure it has. Why? Because it is not the same substance, but has been converted into one that reduces silver.

When business men come to town in the morning they usually find the mixed company in a railway carriage one of the best debating societies in the world. No room there for flowers of rhetoric; for in a few minutes the "circle" is broken up, and its component parts may not meet again for a considerable period. Short and sharp must be the arguments, whether the subject discussed be the 25th clause of the Education Act, the Ashantee war, or the reduction of silver by the agency of the ferric-oxalates. We have listened to a conversation carried on by some who have had this subject evidently more at heart than the great political question of the day as to whether a liberal or conservative government is to be in the ascendant, and who, in reply to a question as to whether two processes might not be compressed into one, have hazarded an idea which will be found touched upon as we proceed a little farther, and upon which we shall enlarge on a future occasion.

But let us, in the first place, make some observations on ferric and ferrous salts. The latter belongs to the *proto* class; the former is of the *per* series. The well-known red pigment, *rouge*, is a ferric oxide, or hydrated ferric oxide. It may be prepared in various ways —among others, by exposing ordinary protosulphate of iron to heat. Hydrated peroxide of iron, or ferric hydrade, may be advantageously prepared by mixing—

Sulphate of iron	4 ounces.
Sulphuric acid	3½ drachms.
Water	1 quart.

Boil, and add slowly nine drachms of nitric acid. To this add three and a-half ounces of ammonia.

Inasmuch, however, as the ferrous salt is converted by light into the ferric, the former is that which most claims our attention. We have already stated that the peroxalate is the favourite salt for experimenting with; but when combined with ammonia it is in its proper condition. The peroxalate of iron (ferric oxalate) is thrown down from the perchloride or persulphate of iron by the soluble oxalates. But it is when in combination with ammonia that the protoxalate of iron yields the best results—when, in chemical language, it forms the "ammonio-ferric-oxalate." To make this salt, take—

Oxalate of ammonia	437 grains.
Oxalic acid	386 ,,
Water	6 ounces.
Hydrated peroxide of iron	*Quant suff.*

The three first are to be mixed together, and, when heated to the boiling point, the last is to be stirred in.

If peroxalate of iron alone were desired, all that would be required would be to add peroxide of iron to a hot solution of oxalic acid in water, strength being of no consequence.

Ammonio-citrate of iron is a salt that is so easily obtained that its preparation scarcely requires any notice. Of several modes of preparing it the following is as good as any. Take of—

Citric acid	4 ounces.
Distilled water	16 ,,
Hydrated peroxide of iron	5 ,,
Ammonia	4 ,,

Speaking in general terms, everything that can be done in photography by ammonio-ferric citrate may also be done, and somewhat better, by ammonio-ferric-oxalate.

If Prussian blue be dissolved in a saturated solution of oxalate of ammonia, and a wash of this applied to paper, a feeble blue image is produced under a negative. The colour becomes intense upon first immersing the picture in water, and then applying a wash of diluted hydrochloric acid. On being washed the image fades when exposed to light, but is restored by being placed in the dark.

Sensitise paper with ferric oxalate, expose under a negative, and wash in rain or distilled water; a very feeble image is the result. But by placing the paper in a solution of permanganate of potash to which a few drops of ammonia have been added, afterwards treating it with solution of pyrogallic acid, a vigorous brown picture is obtained.

Prepare paper by a solution of one part of nitro-prusside of sodium and one part of perchloride of iron in five parts of water. This paper becomes at once of a deep blue colour upon exposure to light.

With one more iron printing process we conclude. In those already mentioned the effect of light is to darken the paper. But Sir John Herschel showed that if paper be washed with ferric citrate (or oxalate) and dried, and then washed with a solution of the ferrocyanide of potassium (yellow prussiate of potash), it rapidly assumes a violet-purple colour, which deepens after a few minutes, as it dries, to almost absolute blackness. In this state it is a positive photographic paper of high sensibility, and gives pictures of great depth and sharpness; but with this peculiarity—that they darken again spontaneously on exposure to the air in darkness, and are soon obliterated. The paper, however, remains susceptible to light and capable of receiving other pictures, which in their turn fade. If washed with ammonia they are for a few moments entirely obliterated, but presently reappear with reversed lights and shades.

We have just seen something really novel in photography, and which may exercise an important influence upon, and give a great impetus to, commercial portraiture. The novelty consists in the production of photographic portraits *in relief*. We believe it is the invention of a French sculptor—a man of great ingenuity and talent. We may convey a general idea of the effect produced by asking our readers to imagine that a *bas relief*, such as one sees upon a medal or coin in which there is a greater degree of relief than usual, has been produced by photography. The amount of relief in the specimens we have seen far exceeds that generally found on medals; the dimension of the pictures is about cabinet size, but there seems no reason why they may not be produced of any size. We are not in a position to furnish any details of their production this week; but we hope in the course of next week to be able at least to indicate where specimens may be seen, if we are then still unable to describe by what means they have been produced.

HOW TO MAKE A SENSITIVE EMULSION WITH COLLODION OR GELATINE AND DRY BROMIDE OF SILVER.

I have now got arranged before me, upon the table at which I am writing, a row of little bottles containing collodion emulsions—not sensitive, but made with common pigments of a variety of different colours, red, blue, yellow, &c., as well as white and black. These emulsions have been made for a special purpose relating to photography, but not to the taking of negatives. When any one of them is poured upon a glass plate it sets quickly, gives an opaque film, and looks very even and pretty from the other side of the glass. These emulsions are quite homogeneous, the pigment being distributed evenly through the collodion, and perfectly well suspended in it. In fact, there is no mechanical difference between these coloured pigmented emulsions and one of collodio-bromide of silver. Nevertheless, some of the pigments used were very heavy—that, for instance, in the white emulsion being carbonate of lead.

Having thus proved that good emulsions can be made with all sorts of pigments added to collodion, one is naturally led to inquire why bromide of silver, which, when dry, may be regarded as a white pigment in powder, might not also be added to collodion in the same way, and made into an emulsion, without involving the objectionable operation of precipitating it by double decomposition at the time of mixing the ingredients.

I will, therefore, explain how my pigmented collodion emulsions were made, and will then suggest a means by which a collodio-bromide emulsion might be made on a similar principle.

I first put into a bottle some plain collodion—such as photographers use, but rather thicker. Next, I took a tube of oil-colour—such as my readers can buy at the establishments of any of the leading artists'-colourmen—and squeezed some of the pigment into the collodion. After shaking all up together well for two or three minutes the emulsion was made, and could be used in about half-an-hour, when the oil and ether had become incorporated together. Nothing in the world can be simpler than this; and I find that the white emulsion spread upon a glass plate makes an excellent imitation of opal, and, when a little diluted, a capital substitute for ground glass for a focussing-screen.

The way in which I would suggest to make a collodio-bromide emulsion is as follows:—Mix together an aqueous solution of nitrate of silver and one of bromide of potassium, the bromide being in excess of the quantity necessary to convert the whole of the nitrate of silver. White bromide of silver will be immediately formed and quickly precipitated. Wash the precipitate several times in water, in order to remove the whole of the nitrate of potash and unconverted bromide of potassium, and drain off the last washing water as closely as possible. Now wash the precipitate two or three times in absolute alcohol, and, lastly, rinse it with ether. Then spread it out upon a glass plate, and, when dry, add to it a few minims of oil, and with the aid of an ivory paper knife mix it all up into a nice creamy paste. Add this to plain collodion in suitable proportion, just as if it were any other oil pigment, and the result ought to be a perfect emulsion of collodio-bromide of silver, entirely free from all soluble nitrate, bromide, or silver salt, and organified with oil. In this state it would probably give an exquisitely-sensitive film not easy to intensify, and strongly addicted to blurring. To remedy the first of these evils a few drops of bromised collodion might be added, which would reduce sensitiveness and give printing density. To get rid of the second evil a little aurine dissolved in alcohol might be added in order to stain the film.

We should then have that long-desired boon, an emulsion which might be poured upon a glass plate, and the latter be then put into a dark slide, without any washing or any organifier. There would be no double decomposition incompletely effected in consequence of the viscidity of the medium in which the ingredients were mixed, and, therefore, no good reason why any mischievous change should occur in the emulsion by keeping. It would alway be ready for use, and its sensitiveness and density-giving properties might be regulated at pleasure by the addition of bromised collodion as required. It would be sufficiently organified by the oil, and no soluble nitrate would remain in it; nor would any red backing to the plate be required, since the emulsion itself could be stained.

Now let us discuss the subject of a gelatine emulsion. In addition to the pigmented collodion emulsion I have also upon the table before me a number of small square pieces of pigmented tissue of different colours—red, blue, yellow, green, &c.—sent to me a few months back by M. Vidal, and made by himself. These prove the possibility of mixing any coloured opaque pigment with gelatine. The late Mr. Burgess, of Norwich, also proved the possibility of mixing oxide of zinc with gelatine for his eburneum process. And, lastly, when I was at M. Braun's establishment, at Dornach, I saw several iron vessels, rocked by a steam engine, in which a cannon ball was placed, and various-coloured pigments ground by its constant motion round the sides. These pigments were subsequently mixed with gelatine and made into pigmented tissue for his printing process.

Now, the above mixtures of pigment and gelatine were emulsions; and since they were fine enough for printing they must have been fine enough for negatives also. Then why not treat dry bromide of silver as a pigment, and mix it with gelatine? Why go the roundabout way in making a gelatino-bromide emulsion which has been recommended by Mr. Bolton and Mr. King? Why not mix the dry bromide of silver with a little glycerine upon a glass slab with a paper knife, and then add it to the hot solution of gelatine? Why have recourse to double decomposition within the emulsion itself, with all the attendant evils of that method, and then use a dialyser to get rid of the soluble nitrate, when the emulsion might be as easily made in the same way as any other pigmented gelatine emulsion?

But, after all, where is the advantage of gelatine over collodion? I confess I have hitherto failed to perceive it. The collodion film sets at once, and there is an end of the matter; but the gelatinised plate has to be laid face upwards upon a shelf for hours to act as a fly-trap and dust collector, and then, being more soluble than collodion, it will not bear the washings with water and hypo. half so well, to say nothing of its strong tendency to blister. Perhaps it may do if made into sheets; but I cannot see any advantage it has for glass plates, or even for paper.

The reader must, however, bear in mind that the remarks contained in this article are only suggestive, and not the result of actual trial of the means which I describe. I have just now some other pressing matters on hand which leave me no time to try the methods myself; nor, in fact, have I much inclination to do so, having lost all interest in emulsions, and having ceased to believe in them as in any way connected with real progress in our art. Besides including, I think, an error of principle, emulsion films must always be more liable to specks and spots from the necessity of shaking up the mixture before pouring it upon the plate. A bath film will give sensitiveness at the surface and density at the back, which is exactly what we want; but an emulsion film is homogeneous throughout, and therefore will give either sensitiveness or density, but not both combined.

If dry bromide of silver cannot be made into an emulsion with collodion or gelatine in the same way as any other powder colour, it will be a very singular fact in the philosophy of molecules.

THOMAS SUTTON, B.A.

ON THE BROM-IODIDES.

[A communication to the Royal Society.]

SOME years ago I ascertained that chloride of iodine combines directly with the olefines and the non-saturated haloid ethers in the same manner as free chlorine or bromine. I have since ascertained that bromide of iodine also enters into direct combination with these bodies.

In the following experiments I have invariably used a solution of bromide of iodine in water, which was prepared by adding rather more than a molecule of iodine in fine powder to a molecule of bromine previously mixed with about six times its weight of water. The bromine was repeatedly agitated during the addition of the iodine, and kept cold by being surrounded by water. An almost black liquid was thus obtained, which was separated from the excess of iodine.

Brom-Iodide of Ethylen.—This body was formed by passing a stream of olefiant gas into the foregoing solution, which was kept cold during the absorption of the gas. An oily liquid soon made its appearance, which was the body in question; it was then subjected to distillation, having been previously washed with dilute potash, and afterwards with distilled water. Almost the entire quantity passed over without decomposition between 162° and 167° C. This gave on analysis the following numbers:—

	C_2H_4BrI. Theory.	Experiment.
C	10·21	10·35
H	1·70	1·79

At the temperature of the air this is a solid body, consisting of a mass of long white needles, which melt at 28° C. At 29° it has a specific gravity = 2·516. It has a sweet, biting taste; on exposure to light it becomes slightly coloured, from the separation of free iodine. When subjected to the action of alcoholic potash it yields iodide of potassium and a gas burning with a green flame, which is doubtless bromide of vinyl. It is an isomer of the brom-iodide obtained by Pfaundler, and afterwards by Reboul, by exposing bromide of vinyl to the action of hydriodic acid. Pfaundler's compound boils between 144° and 147° C.

Brom-Iodide of Propylen.—This body was formed by passing propylen-gas derived from iodide of allyl into the brom-iodide solution. It was washed with dilute potash, then with water, and distilled. The greater part passed over between 160° and 168° C., suffering, however, at the same time, slight decomposition. The distillate was then analysed, having been previously agitated with mercury to remove free iodine. The following are the results:—

	C_3H_6BrI. Theory.	Experiment.
C	14·46	14·89
H	2·41	2·77

Notwithstanding the difference between the theoretical and experimental numbers, I believe this is a definite compound, and not a mixture of bromide and iodide of propylen. The discrepancy probably arises from the slight decomposition which the body suffered during distillation.

Brom-iodide of propylen is, when freshly prepared, a colourless, oily liquid; it has a sweet and biting taste. Treated with alcoholic potash it yields iodide of potassium and brom-propylen (C_3H_5Br).

Iodo-Dibrom-Vinyl.—When the brom-iodine solution and bromide of vinyl are brought into contact, direct combination takes place, and this body is formed. In order to complete their union it is advisable to heat them gently in a sealed tube. A portion of the oily product thus obtained was washed with potash and distilled; almost the entire quantity passed over between 170° and 180° C. As, however, it suffered considerable decomposition during distillation, I analysed in preference a portion of the remainder which had *not* been distilled, having previously dried it at 100°, and agitated it with metallic mercury to remove a trace of free iodine. The following are the results of the analysis:—

	$C_2H_3Br_2I$. Theory.	Experiment.
C	7·64	7·67
H	0·96	1·11

This is a colourless, oily liquid; like the others it has a sweet and biting taste. Its specific gravity at 29° C. is 2·86. Heated to the temperature of 100° in a sealed tube with moist oxide of silver it occasioned a violent explosion. Heated in an open retort with the same body it evolved carbonic acid gas and bromide of vinyl.

MAXWELL SIMPSON, F.R.S.,
Professor of Chemistry, Queen's College, Cork.

ON DURABLE SENSITIVE PAPER.

[A communication to the Edinburgh Photographic Society.]

IN saying a few words in opening the discussion on this subject it will not be out of place to begin by stating the importance of having a prepared sensitive paper that will keep for some time. There are a great number of photographers to whom such a paper will be useful. To photographers who print in large quantities, and whose prints are toned regularly every night, such a paper may not be of much use; but to persons who have only a few prints, and who only print occasionally, a paper that will keep for some time is a great advantage. When such a person has a few negatives ready for printing, or when a good day for printing comes, a great deal of time is wasted in the preparation of paper; and sometimes during the winter the best part of the light has gone before that can be done. It is also very useful, when the prints are not sufficiently done at night, to lay them aside till the next day, or till some other time when it may be convenient to finish them.

About the beginning of 1872 I devoted a great deal of time and trouble to preparing paper that would keep sensitive for a time; and on the 3rd of May in that year I published in the *Photographic News* a formula for preparing paper to keep. With the paper prepared at that time I was hardly satisfied, as it scarcely gave prints equal to those by freshly-prepared paper, though it possessed excellent keeping qualities. Some that I kept for more than twelve months was still white enough to give good results. You will here allow me to say that I should not be satisfied with any paper, however prepared, which did not give prints equal to those on the best freshly-prepared paper. There are three qualities which a perfect keeping paper should possess. In the first place, it should keep well for some time, say from four to six months; secondly, it should tone easily, and give a good tone; thirdly (though it ought to come in the first place), it should give results equal to what I may call a standard—that of freshly-prepared paper. I am afraid, however, that these three qualities are not so easily combined, and that the paper which will possess them all is still a thing to be found. It is perfectly easy to prepare a paper possessing the first-mentioned quality—that of keeping. I here show you a couple of prints on paper prepared twenty-two months ago, of which the white part is scarcely at all yellow, but you may see at once that it does not give a good, vigorous print; in short, though it has the first, it lacks the other qualities.

I may lay it down as the result of my experience that the longer the time albumenised paper is prepared to keep the less satisfactory will be the results. I have also proved this from samples I have tried of papers prepared commercially, but whose method of preparation is still a secret. One sample of paper which I procured kept very well for upwards of three months; but, after printing and putting in water before toning, it turned, evidently from something introduced in its preparation, very disagreeably transparent, as if saturated with something of a waxy or oily nature, which it never entirely lost, even when dry and mounted. It toned very slowly, the difference being most apparent when toned beside other prints on freshly-prepared paper. It also had, as I have already said, when mounted, a sort of transparent look and a woolly appearance; in short, it was not up to what I have called my standard, and, therefore, did not please me.

I had also another sample of paper prepared commercially. It gave very good prints, of which you have here a sample; it also toned easily along with prints on fresh paper, but is somewhat deficient in keeping qualities. I have here a piece of the paper—about seven weeks from the maker—which, although carefully kept in a tin case, is quite discoloured—too much so to give good prints.

Here is a print by a paper with which I am greatly in love—I mean the collodio-chloride. Prints by this paper possess singular beauty and a rendering of all the finer half-tints and delicate detail in a negative—a sharpness and a softness combined, if I might so speak—which it is impossible can be given by an albumenised paper. But, though I thus praise the paper, it has also its defects. Whenever it touches the water when washing or toning it, it has an inherent tendency to coil or curl up, which it does not lose till finally on the mounting-board. There is also a difficulty with the toning. If toned to anything similar to the colour that an albumenised print should have, it gives a poor, bleached, blue-looking print—nothing like what it was when it left the frame. The toning difficulty can be got over by under-toning the print to the look, as when fixed the print comes a great deal in the tone.

Could a paper of this kind be so perfected as to give as little trouble as albumenised paper I have no doubt that it would be the printing process of the future for small work, such as cards. The paper has the merit of keeping good for years. The samples which I now show have been prepared between two and three years, and are very slightly coloured. Prints on this paper have a permanent character, and have also, as I have already said, a beauty which we can never hope for in prints on albumenised paper, or, in fact, by any paper or process.

I will now give in a few words the method by which I prepare albumenised paper to keep for a few weeks. Paper so prepared can also be made to keep for twelve months; but I do not recommend that, as it is at the expense of the toning and finished results. I do not think paper by this method should be prepared to keep more than from two to three months.

The paper is first floated on the usual silver bath of from forty to sixty grains, and hung up to dry. When nearly dry, but not dry enough to curl up, it is floated on a bath of citric acid five grains, water one ounce. It must lie only a very short time on the bath—just so long, and no longer, than that the paper may lie flat when it is again hung up to dry. Such paper will keep white for some weeks. Should the paper be required to be kept longer it may be left a little longer on the bath, or the citric acid may be increased to ten or fifteen grains, when the paper will keep longer, but not give such good results. Paper floated on the five-grain solution tones as readily, and gives as good finished prints, as the ordinary paper. Here are prints by it, both toned and untoned, from which the members can form their own opinions. J. M. Turnbull.

ON A COMBINATION OF SILVER CHLORIDE WITH MERCURIC IODIDE.

In the course of an extended examination of the compounds formed by mercuric iodide I, some time since, obtained two which I believed to be new. After having studied their properties I found that one of them, a compound of the iodides of silver and of mercury, had previously been obtained by Meusel. I shall, therefore, here describe only the compound which mercuric iodide forms with silver chloride.

If to a portion of recently-precipitated and still moist silver chloride a considerably less quantity of mercuric iodide, also freshly precipitated and still moist, be added, we shall find that, after stirring them thoroughly together, the scarlet colour of the mercuric salt is still plainly visible through the mass, which is of a bright salmon colour. By standing some hours or a day a remarkable change takes place, the red colour wholly disappears and the powder becomes pure lemon-yellow. Before this change took place the separate particles of the mercuric iodide could be plainly distinguished with a lens; after it, the powder becomes perfectly homogeneous. Fresh portions of mercuric iodide added gradually disappear in the same way, until an equivalent quantity has been used.

A better plan, however, for preparing the substance consists in adding to a solution of a weighed quantity of potassic iodide an exactly equivalent quantity of mercuric chloride, and then, after thoroughly agitating and allowing the precipitate to fall, adding an equivalent quantity of silver nitrate, also in solution. The potassic chloride formed by the first reaction is exactly sufficient to throw down the whole of the silver as chloride. When the silver salt is added one may remark three precipitates visible in the liquid—irregularly-blended scarlet mercuric iodide, white silver chloride, and the yellow substance resulting from their combination. The precipitates are then to be thoroughly stirred together to promote combination, which, however, is not complete for about twenty-four hours. Meantime the mixture is salmon-coloured from the presence of free mercuric iodide.

Obtained in this way the substance appears as a heavy yellow powder, wholly free from any trace of red, and rather inclining to a greenish or lemon-yellow. This colour it always exhibits, no matter how prepared, while still wet, even if left for weeks. Mixed, however, with gum arabic and spread on cardboard it dries to a full chrome yellow. It could not be obtained in a condition sufficiently pure for analysis, but there can be little doubt that its constitution is $AgClHgI$.

The new substance exhibits remarkable properties with respect to heat. Even below 100° F. it begins to redden, and this change rapidly increases with the rising temperature until it reaches a maximum at about 140° F. At this temperature it has a bright scarlet colour, differing, however, a good deal from that of mercuric iodide, and more resembling, if moist, that of chrome red; if dry, that of vermilion. As the temperature falls again the pale yellow colour returns. A striking experiment consists in placing a portion of the substance in a test tube under water, and warming it at a Bunsen's burner. The very instant that the flame touches the glass the whole layer of substance in contact with it flashes to a bright red. If heated till it is changed throughout, a portion taken out with a spatula and dropped on a cold porcelain dish becomes yellow at the instant of contact.

If a portion of the substance be mixed with a solution of gum arabic and be spread on cardboard it exhibits the following properties:—

Warmed gently at a lamp (best by holding it near the glass chimney of an argand burner) it assumes a deep red colour; then, when removed, it recovers its yellow shade. Both changes take place so rapidly that the alteration of colour may be watched, and is complete in a few seconds or half-a-minute. If, instead of gently warming, a strong heat be applied, just below what is sufficient to char the card, the portion thus strongly heated assumes a still deeper colour, and returns to the yellow much more slowly, retaining an intermediate orange shade for some hours. This change is brought about by a sudden and momentary heat: if the heat be continued the mercuric iodide volatilises, and the portion so treated becomes permanently yellow.

If one of these cards be exposed to sunlight with a portion perfectly protected the exposed part becomes slightly darkened. This effect takes place with an exposure of half-an-hour or less, and is scarcely increased if the exposure be prolonged for many hours. By keeping for a few days in the dark the deepening of colour gradually fades out until the exposed parts are not to be distinguished from the rest. This effect may be repeated several times with the same card.

In reference to the compound of silver iodide with mercuric iodide, I feel constrained to differ from Meusel, who considers it only a mixture, and not a combination. I take it to be a compound, though an extremely loose one, and for the following reasons, which apply equally to the silver chloride compound:—

So long as the substances are only mixed, and before they have united, the characteristic colour of the mercuric iodide is always conspicuously observable, and no mechanical mixing, however thorough, is capable of concealing it. The eventual disappearance of this colour seems to be a proof of combination. This view is farther strengthened by what takes place in the case of *silver bromide*. When HgI is placed in contact with $AgBr$ no combination takes place, as in the case of $AgCl$ and AgI under similar conditions. Even after many days the colour of the mercuric salt is conspicuously visible. In one case I kept HgI in contact with excess of $AgBr$, both freshly precipitated, for several weeks under water, at the end of which time the particles of HgI could be distinguished under a lens with perfect facility. At the end of weeks the mixture of $AgBr$ and HgI retains exactly the appearance which it presents when first mixed (supposing, of course, that it has been protected from the light). $AgCl$ and AgI, when mixed with HgI, present at first the same appearance, which, however, subsequently changes completely, and a substance with new properties is the result. This seems clearly to indicate a combination.

The striking fact that the thermochromic properties of mercuric iodide are inverted in the new compound, which passes from yellow to red by heat, instead of from red to yellow, and the far greater sensitiveness to heat of the new substance, are strong arguments of combination.

Meusel's explanation of the change of colour, in his view of mere mechanical mixture, makes it depend on a diminished power of absorbing red rays when warmed, which he ascribes to silver iodide. But the experiment which I have described with the substance spread on cardboard disproves this explanation in two distinct manners.

At a temperature about 30° or 40° F. above the boiling point of water mercuric iodide becomes yellow. If, therefore, the new substances were mere mixtures, on being heated to that temperature the red colour previously acquired should disappear completely, since there could be no possible cause for its continuance. The mere mechanical mixture of two yellow substances (in the case of AgI and HgI), or of a white and a yellow (in the case of $AgCl$ and HgI), could by no possibility produce a red one. This single argument would seem to be sufficient in itself.

The peculiar persistency, after applying momentarily a high heat, seems also inconsistent with the hypothesis of a mechanical mixture. Let us follow the phenomena which present themselves, and consider them in the light of this hypothesis of a mechanical mixture. The substance is at ordinary temperatures yellow; it is difficult to suppose that white and scarlet mechanically mixed can form yellow. At 140° F. it is deep red. Now this rise of temperature makes no visible change in the colour of either constituent, taken separately; if the mixture be merely mechanical it is difficult to see why the colour should change. At a still higher temperature—let us say, for example, 300° F.—mercuric iodide is yellow, but the substance in question is deep red. And, whereas before we had white and red mechanically mixed forming yellow, now we have white and yellow forming red. Even the phenomena of persistence are reversed; for, whilst mercuric iodide after cooling retains for a time its yellow colour and then passes to its normal red, this substance, after a strong momentary heating, retains for some time after cooling its red shade, and eventually recovers its normal yellow.

These properties seem to be irreconcilable with the view of mechanical mixture. The behaviour of the substance when exposed to sunlight also affords a strong argument. The very faint darkening caused, and the gradual recovery of the original colour, seem inconsistent with the hypothesis of the presence of free silver chloride. There is no doubt that the combination is a loose one. By repeated boiling with a considerable quantity of water most of the mercuric iodide can be dissolved out, and this may be still more easily done with alcohol, in which mercuric iodide is more soluble than in water. This, however, is, of course, no proof of absence of combination, as many compounds can be broken up in a similar way. Even after repeated boiling with water, a portion of the mercuric iodide is held back, and it is curious that the abstraction of the mercuric salts does not change the colour of the residue. The silver chloride does not recover its whiteness, the yellow colour remains unchanged, but the property of reddening by heat disappears with the removal of the mercuric iodide.—*Am. Jour. of Science and Arts.* M. Carey Lea.

SOME OF THE PULL BACKS BETWEEN EMPLOYERS AND EMPLOYED.

For many years after the start of photography it was looked upon as a shifting, unsteady business—one that would flicker for a time and then die out; but now that it has asserted itself and settled down into a regular trade it goes on as steadily as any of the many professions, soft or hard.

We can now calculate our profits and returns by the state of the weather, the good and bad seasons, the time that our clients are in or out of town, and can tell what each month will bring with as much certainty as can be done in any existing fluctuating business. One of the greatest pull backs to the steady success of the trade is the fact that, as a rule, there is no given term of apprenticeship to serve; hence before a hand is two years at the business, with but a very imperfect conception of both the chemical and mechanical parts of it, just because the employer has allowed him to expose a few plates and he gets through the work fairly, he immediately "strikes the bright" that Jack's as good as his master," and if he had but a little money he would not be long in starting a place of his own.

Another pull back is to make a small start requires very little money, so that, when a father can spare forty or fifty pounds of hard-earned savings, with a father's pride he puts his son into business. In many such cases the youth starts opposition to his employer, and, of course, cutting down prices by this means induces many to go to him, no matter how miserable the productions, and so the trade for a time, to some extent, is split—in nine cases out of ten not bringing much harm to the original employer and launching the young aspirant into a sea of debt and troubles.

From this seed of discontent on the part of the employed springs up another pull back, viz., employers teach their servants as little as ever they can, having this "starting" dread ever before their eyes. This is far more noticeable in small towns, where one more in a limited trade like ours is a serious question, than in cities, where it is not so much felt, and, consequently, not so much thought of. Two out of every four of these premature births of studios turn out dead failures. For the other two, one is a lingering from hand to mouth, made up principally of smoking and laziness, and one a comparative success, so that seventy-five per cent. of the money is wasted, and a considerable pull back in the journey of life to the aspirant certain.

The above may be considered an exaggeration; but, having made the subject a study for years, I think the amount of success and failure noted is a fair average. There never was a time when the *employés* of photographers of any ability stood in a better position as regards good situations and good salaries. It comes to the old question of supply and demand. Comparatively few learn the trade, fewer learn it well, so that first-class situations are always a-begging for some one to fill them, and it seems very hard to get them well filled. The best way out of this drag upon the trade, which must be felt by all, would be for employers not to engage young hands who wish to learn the business for less than five years, during that term giving them every instruction, and letting them have every opportunity of gaining a thorough knowledge of the trade in all its branches. By this means we would get rid of the idea that it was a thing to be acquired in a week or a fortnight like the "coming, sir!" of a waiter or a pot-boy. We should also have men about us who could be trusted with the work. By this means we would get rid of another pull back, viz., the half-labourer, half-photographer, who, to look upon, has anything but a clean, healthy appearance. The greasy coat without buttons, the spotted shirt, the begrimed hands which the poor silver gets all the blame of, the boots down at heel, and a general appearance of dilapidation, anything but artistic—this half-bred, so prevalent in our midst, would die out, and a more healthy, thorough-bred would take his place.

There is not a man who has learned the trade through and through and made himself proficient in all its branches but will command more money weekly than at any other trade, with the exception of mining, perhaps; and there is the advantage of working on the face of the globe in the sunlight, instead of the bowels of the earth in the darkness, to counterbalance that exception.

If a photographer had a young assistant engaged for five years there would be a bond of confidence between them, and the employer would undoubtedly do everything in his power to make him proficient in his trade; at least, there is far more likelihood of such being the case than now, when he does not know the day nor the hour when the youth may take it into his head to leave and take the place next door.

In other businesses, where a comparatively large capital is required to start, the employer never once thinks of opposition from his hands—the thing happens so seldom; but in the photographic trade, it being of daily occurrence, the masters have to look after themselves, and in doing so the employed are deprived of many advantages and instruction which are necessary to proficiency.

And now a few words to assistants. To go into business is often a serious pull back, believe me. It is better to be working for 40s. a week than knocking a hundred a year out of a place of your own. It is far better to be going on to £3 a week than toiling on through sunshine and shadow to try and make a trade of your own worth £150 a year. By this means you may save as much as will buy a business that is already doing well, or with the aid of an older and wiser head than your own be able to open in some field where demand calls for it. I do not say—"do not start business," but save up, make a judicious choice, and plant where the seed is likely to grow; and do not, as is so often done, rush at it, or it is sure to be like the frog that wanted to be a bull—it will burst.

Mark Oute.

FIXING BY MEANS OF SULPHOCYANIDE OF AMMONIA.

The *Moniteur de la Photographie* publishes a short memorandum on this subject which may be of interest to our readers. This method of fixing positive prints has been hindered hitherto from obtaining any place in photographic practice by the red, and often dull, hue which it gave to the finished image. According to M. Cayol this defect has now been remedied, and, under the conditions of working which he gives, the sulphocyanide has been used for months with results in every way satisfactory.

This process is said to possess the enormous advantage of absolutely securing the permanence of the silver prints, by which we suppose it is meant that, so far as chemical reactions can be traced in relation to it, there is no reason to suppose that the prints will fade. Could we be as certain that a silver print will stand all vicissitudes of weather and light as well as we now rely upon carbon pictures doing, silver printing would still possess enormous advantages over every other method for the ordinary photographer. At anyrate, as M. Cayol says, the sulphocyanides do not contain, as the hyposulphites do, the germ of sulphuration which so often proves the ruin of the silver image.

The plan followed by M. Cayol is as follows:—A solution of sulphocyanide of ammonia is made with common water of the strength of fifteen to twenty parts of sulphocyanide to the hundred. To this sufficient ammonia is added to render the solution slightly alkaline. Divide the solution thus prepared into two parts, and plunge the prints into the first half for four or five minutes; withdraw them then and wash them slightly, after which put them into the second half of the solution for two or three minutes. After that subject them to a thorough washing for about an hour. It is easy to ascertain whether the prints have been thoroughly cleaned then. One has only to take some drops—say half-a-drachm—of a solution of sulphide of sesquioxide of iron and pour it into a glass containing some of the water in which the prints have been last washed. If this water do not thereupon turn red the prints may be considered thoroughly cleaned and indelible.

One advantage of this mode of fixing is that, in spite of the high price, comparatively, of the sulphocyanide, it is cheap, for it can be used for a long time. It is only necessary to clear it from time to time of the silver with which it becomes charged, and this is easily done by putting strips of zinc in the liquid, and filtering it always before using. M. Cayol intends entering more particularly into the subject at a future date. Meantime the subject is one that may prove of interest to our readers, who know what it is to live in a sort of perpetual dread of hyposulphite of soda.

PRINTING, TONING, AND FINISHING.*

Fuming.—When the paper is thoroughly dry it is fumed; and although nothing further need be said upon this part of the subject, I will venture to describe my fuming box—a little piece of apparatus which I devised several years ago, and is so much of a convenience it seems to me that others might also find it useful. It consists of a tight box made of matched stuff well put together and a drawer. The box is fastened up against the wall in the printing-room in an inverted position, so that the drawer is opened by sliding downwards, and, of course, shut by sliding up. The drawer is the principal thing in the contrivance. It is wide enough to accommodate a sheet of paper, and is some six or eight inches longer than the sheet—say thirty inches long by twenty inches wide and five inches deep. The *top* end of the drawer is omitted, instead of which two pieces of twine are stretched across, from which by means of clips the paper is suspended. The sides of the box extend down two feet below, and serve as guides for the drawer when let down to put in or take out the paper. A stop is fastened to the wall, upon which the drawer rests when so let down or opened. A spring made of common strap iron is let into the left guide piece, in such a position that when the drawer is closed it is held by the spring in its place; a slight pressure with the thumb of the left hand allows the drawer to open. A bottle of ammonia is placed on the lower end of the drawer, where it is always at hand for use as occasion requires, and a small glass tumbler, from which the fumes are given off, completes the arrangement. By this device the fumes of ammonia, which are lighter than air, are allowed to remain in the fuming-box when the paper is removed; and in all respects the machine is as convenient as possible.

There is a question of some interest relating to the variable strength of the printing solution required by negatives of different printing qualities. On this subject there seems to be a variety of opinion.

In a work by Hardwich, published fifteen years ago, the following remark occurs:—"An exception may be made in case of negatives of great intensity, which are printed most successfully upon a weakly-sensitised paper." In an edition by the same author, published in 1866, after directing that the bath should be ninety grains strong, he says:—"A bath prepared by the above formula is stronger than actually necessary. But it has been found that paper floated on weak solutions is more or less deficient in vigour."

Mr. Anderson says:—"The strength of the positive bath must be regulated by the strength of the negative; the stronger the negative the weaker the bath may be. For a moderately-strong negative the bath may be between sixty and sixty-five grains to the ounce; very thin and weak negatives require a bath of seventy to eighty grains."

In the July number of the *Philadelphia Photographer*, Mr. Clemons, in his advice to printers, says:—"If made too strong, I should use my silver much weaker than if the negatives were made weak."

From all these authorities it appears to be held that the printer, in order to obtain the best results from a weak negative, should use a stronger bath, and for an over-strong negative he should use a weaker bath, than is required for a negative exactly right in respect to printing qualities—that is, neither too weak nor too strong.

In face of this conclusion, I beg to submit the following experiments:—I am using paper that, with a vigorous negative possessing good intensity in the high lights, with intermediate gradations to transparency in the extreme shadows, will give a vigorous and brilliant print with a silver bath forty-grains' strong. We may call these three conditions normal—to wit, the bath at forty grains, the paper adapted to this bath, and the negative from which, by means of the other two—the perfect result is obtained. The negative supposed is normal absolutely and always; the paper and bath relatively—that is to say, the bath at forty grains is normal in respect to the paper under experiment. Suppose, now, we have a weak negative—one which, the paper and bath remaining the same, will give a print in which, when the high lights and half-tints are sufficiently printed, the shadows are under-printed. Reduce the strength of the normal solution to thirty grains by adding one part of water to every three parts of bath. Print in the shade. The shadows now will print deeper during the time required to print the high lights and half-tints, or, in other words, better contrast will be obtained. In speaking of prints from weak negatives "better contrast" means more contrast; in speaking of prints from too strong negatives, the reverse is implied.

If I have given a true account of this experiment it must follow that a stronger negative will require a stronger bath. A negative is too strong when, with the normal bath, the shadows and half-shadows are sufficiently printed before the high lights and half-tints are sufficiently printed. The drawing in the light parts of the picture is too faintly rendered; the picture is flat and harsh. As before stated, it may be improved by printing on a strong bath.

When the print comes from the printing-frame it contains several substances which must be removed. There are the violet subchloride (Ag_2Cl), the red or yellowish-red suboxide (Ag_2O), and the free nitrate ($AgNO_3$). The free nitrate being soluble is removed by washing; after which the subchloride and unreduced chloride must be removed from the print, as they are capable of further reduction by the light. Who has not wished that the print might be taken from the frame just at the right moment, and so preserved? But that which constitutes its beauty of colour at that point is the violet subchloride on a substratum of the red suboxide. If it be now placed in the fixing bath, the subchloride is dissolved, and the suboxide left, but the colour in this condition is not satisfactory; so a substance was sought for to supplement this suboxide, and compensate for the loss of the subchloride. The search was successful and the result admirable. Gold came to the aid of its nearest of kin; and here in the toning bath takes place another of the beautiful transmutations of which so many are concerned in the production of the photograph. The toning bath is a solution of gold. We wish to put "apples of gold in our pictures of silver." After washing away the nitrate of silver from the print (for the reason that the nitrate would only cause a useless waste of gold) we place the print in the toning bath. Now the chloride of silver cannot be toned by gold! Why? Because the chloride of silver will not take any of the chlorine away from the chloride of gold. But the subchloride will take a little—enough to change it from the subchloride (Ag_2Cl) to the chloride ($AgCl$); that is, one atom of chlorine for every atom or molecule of the subchloride. This accounts for the bleaching which usually takes place, the violet subchloride being changed to the chloride, which is white. But, if the bath be acid with hydrochloric acid the subchloride is quickly changed, and then some of the suboxide gives way, and is converted into the chloride again. Hence the more hydrochloric acid the more bleaching. But the toning takes place upon suboxide of silver, which is being converted into the chloride by the chlorine of the chloride of gold, and the gold takes the place of the silver thus removed.

The chlorine from the gold probably acts in this way:—First, it changes the subchloride of silver into the chloride—that is, in the high lights the print becomes white; then the violet colour begins to return on the reddened print—that is, the suboxide is changing into subchloride, and, at the same time, the gold is depositing and darkening the colour. When this is carried to the desired extent, and the print is transferred to the fixing bath, the first thing that takes place is the removal of the subchloride—that is, the violet colour of the print quickly disappears. The toning bath then should not contain hydrochloric acid. It must not contain nitric acid, for this would produce *aqua regia*, which would dissolve the gold. This is what I suspect takes place when the prints are measly. As before stated, nitric acid is set free in the printing bath when the paper is silvered. In my practice I intend to keep this solution a little alkaline, and while it is so that disease never makes its appearance. If it happen to make its appearance in the toning bath I invariably find the silver bath acid. The trouble might be in the toning bath itself, if the nitric acid used in making the chloride of gold were not disposed of. It might be presumed that fuming the paper would neutralise all the acid derived from the printing bath, but I believe the measles prove the contrary.

There are various modifications of the gold-toning bath, as now generally used, in all of which the essential features are that the

* Continued from page 7.

free hydrochloric acid is neutralised, and the toning is performed by the chloride of gold, some slight but unimportant variations in the result being caused by the different agents employed, such as carbonate, tungstate, biborate, phosphate, and acetate of sodium. Nitrate of uranium, chloride of calcium, chloride of lime, carbonate of lime, and magnesium are also sometimes used.

There appears to be some choice in the method of preparing the gold solution, and it is not unlikely that the condition of the printing bath has much to do with the kind of toning bath required. If, for example, the printing bath is acid, the toning bath may better be alkaline; whereas, if the former be alkaline, it may be only necessary to neutralise the gold solution to obtain the best results.

W. H. Sherman.

(To be continued.)

Contemporary Press.

ON THE SENSITIVENESS OF BROMIDE OF SILVER.

[Photographic Mosaics.]

It is curious that our knowledge of the qualities of the fundamental elements of photography—I refer to bromide and iodide of silver—are still very defective. We have the results of numerous investigations by Muller, Schultz-Sellack, and Draper, but some new data come all the time to light yet. Muller and Schultz-Sellack demonstrated that iodide of silver is more sensitive than bromide of silver, and that the mixture of iodide and bromide of silver as used in photography is more sensitive to coloured light than either salt by itself. This seemed to settle the matter until Lea introduced the bromine plates with alkaline development. These plates were almost as sensitive as iodide of silver plates, and Schultz-Sellack ascribed this to their dry state, and thought that by the drying process a change in the sensitiveness was brought about; but this is not so. It is not the dry state, but the alkaline development, which overthrows our old ideas about the sensitiveness of the two salts. Bromide of silver, with an alkaline development, shows a much greater sensitiveness to light than with an acid one. The reverse takes place with iodide of silver. The reason of this curious circumstance is to be found mainly in the nature of the acid and alkaline development. With the alkaline development the salts of silver which have been affected by the light are reduced by the developer (pyrogallic acid and ammonia). With an acid development this does not take place. Iodide of silver can only be reduced with difficulty, while bromide of silver yields readily. It is, therefore, more sensitive to alkaline development than iodide of silver. The latter is of hardly any value in plates which are developed with an alkaline developer; it is better not to employ it at all in such places, as it is only a useless ballast.

It is very curious also that the sensitiveness of the bromide of silver or colours is also increased materially by an alkaline development. When we expose a bromide of silver plate to the solar spectrum, and develope with an acid developer, we will find that the ultra violet, violet, and blue rays have affected the film, while green has exercised no influence. If we develope a similar plate with an alkaline developer, the action will extend much further; it extends beyond the green into yellow and orange.

Bromide of silver, therefore, with an alkaline development, is much more sensitive to colour than any other photographic preparation that we know of. Something in it, however, is peculiar. The chemical action of the rays of light ordinarily increases gradually from red to violet; for chloride of silver even beyond the violet. With bromide of silver, however, the green of the spectrum exercises a stronger chemical influence than the light blue. The intensity decreases from the green to the line F of the spectrum; beyond this it increases again, and becomes most marked between G and H, *i.e.*, in the indigo and violet.

It follows that bromide of silver with alkaline development will yield pictures of coloured bodies, in which the tone of the different hues varies from the pictures taken on ordinary negative plates. Experiments have confirmed this. In how far these peculiarities of bromide of silver plates are of importance for reproducing paintings has to be determined by further experiments.

H. Vogel, Ph.D.

Our Editorial Table.

The British Journal Photographic Almanac for 1874. Edited by J. T. Taylor.

London: H. Greenwood, 2, York Street, Covent Garden, W.C.

The plethoric appearance of The British Journal Photographic Almanac for 1874 affords ample proof of the healthy growth of this photographic "perennial." With textual contents of more than one hundred and eighty pages on a variety of subjects of practical interest, and business announcements extending over a hundred pages, we have here a volume which, in the history of photographic annual literature, speaking quantitatively, has never been equalled. In respect of quality it is sufficient to point to the names of the respective contributors. The volume this year differs from any former one in containing a Woodburytype of singular beauty, the subject being two children with intertwined arms. Mr. Ramsden, who claims paternal relationship with the tiny "sitters," informs us that the pose is quite natural, being one assumed by the children themselves almost by way of frolic, and was at once perpetuated by the artist.

For obvious reasons we need not here speak of a somewhat lengthy and profusely-illustrated article on cameras, in eight chapters, by the Editor, but proceed to make a passing comment upon two or three of the valuable series of articles contributed by various gentlemen of the highest reputation as exponents of the theory and practice of photography.

Professor Piazzi Smyth's suggestion of a method by which a portrait lens possessing a round field can have that field so flattened as to give a sharp picture upon a plane surface is one more pregnant with interest than might at first sight appear. Lenses corrected so as to be free, or nearly so, from astigmation will only work sharp upon a hollow surface. Any attempt to flatten the field is made at the expense of marginal sharpness; hence flatness of field and sharpness have never been found co-existent in a lens working with full aperture. Thanks to the researches of Professor Smyth, an important advantage has now been secured; for by the introduction of a plano-concave lens close in front of the sensitive surface the marginal pencils of a portrait lens are found to be prolonged without being astigmated. The result of this will doubtless be the ability to secure instantaneous views with lenses working at full aperture, and of such sharpness as to permit of enlarging to a degree hitherto been found impossible.

To photographic experimentalists at a loss for an easy mode of computing combining quantities in chemicals Mr. Jabez Hughes's excellent article on this subject will prove a friend in need. In the hands of Mr. Hughes this imperfectly-understood branch of photographic chemistry is rendered exceedingly plain and easy to be understood.

We are scarcely able to assent to a statement made by Mr. F. G. Eliot, in his article *On the Use of Wide-Angled Rectilinear Lenses*, to the effect that an architectural subject photographed by a lens of this description will have diverging perpendiculars. This, we imagine, can only be so in the case of a lens in which the position of the stop has been imperfectly selected, and in that case the distortion would assume the form of *curvature* rather than of divergence of parallel lines. With lenses of this class we have tried there was no distortion whatever when the ground glass of the camera was placed quite parallel to the building being photographed. Of course the slightest deviation from parallelism would undoubtedly produce the effect of divergence complained of.

From among the numerous excellent articles in the Almanac it is impossible to single out any for special commendation; but we may allude to a subject which has acquired importance of late—the substitution of gelatine for collodion in the bromide emulsion process. Those desirous of trying this process will find directions given in the simplest and plainest manner by Mr. King—a gentleman who has bestowed much thought and experiment upon the process—and by Mr. Bolton, who is well qualified to write upon this matter. The subject of printing, from the preparation of paper that will keep sensitive for a long period down to the best way of making paste to mount the finished prints, receives full treatment from able exponents. Silver baths, both for negatives and for printing, are carefully treated of in relation to their preparation and after care. We need scarcely say that in this class is to be found the barytes negative bath of Mr. A. L. Henderson. For those who desire to print upon canvas Mr. H. T. Anthony describes the method used with much acceptance in New York.

What with photo-enamelling, transparencies, toning processes, collodion, enlarging, developing, dry processes, tents, cameras, and the thousand-and-one things in which photographers feel special interest, the work is full to overflowing. Nor, while the manipulative and chemical departments have received such a large share of attention, has the art-aspect been left unnoticed—as any reader will find after perusing the articles by Messrs. Rejlander, Gough, and others.

The Editor has devoted several pages to a summary of progress made during the past year, which will be found useful for reference.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

On Tuesday evening last a special meeting of this Society was held in accordance with a requisition by several of the members, the object of the meeting being the alteration of certain of the laws. There was a large attendance. The chair was occupied by Mr. Glaisher, President of the Society, who read the requisition which we printed two weeks since at page 36 of this Journal. He concluded by hoping that the meeting would result in good to photography and to the Society at large.

Mr. Jabez Hughes moved that Law V. be repealed, and that the following law be substituted for it:—

"The business of the Society shall be conducted by the President, three Vice-Presidents, and eighteen members of Council. At all meetings of Council five shall be considered a quorum.

"The President shall be elected to serve for three years, and shall not be eligible for re-election until after a lapse of one year.

"The Vice-Presidents shall be elected to serve for three years. Each year one of them shall retire from office (the rotation being by seniority), and shall not be eligible for re-election, or to serve as a member of Council, until after a lapse of one year; but shall be immediately eligible for the office of President.

"The members of Council shall hold office for three years. One-third shall retire each year by seniority, and shall not be eligible for re-election as members of Council until after a lapse of one year; but shall be immediately eligible for the office of Vice-President or President without waiting such interval of time.

"The Council shall hold its meetings at times to be determined by itself. Questions before the Council shall be settled by show of hands, unless a ballot is demanded. Any member personally interested in a question under the consideration of the Council shall retire during the discussion. The Council shall prepare a report on the general condition of the Society, for submission to each annual general meeting."

And, further, that the following new law be substituted for old Law VII.:—

"At the ordinary meeting of the Society in the January of each year the Secretary shall declare the names of the Vice-President and of the members of Council who retire from office, shall state the fact when the term of the President's holding office expires in that year, and shall invite the members present to nominate their successors, every name being proposed and seconded in open meeting. The list of nominations shall then be publicly read by the Secretary, and a copy of the same shall be sent to every member of the Society before the next annual meeting in February.

"The election for all vacant offices shall take place at the annual general meeting in February. If there be no more persons nominated than are required to serve, those persons shall be held to be duly elected. If there be more than one nomination for the office of President, or more than there are vacancies for among the Vice-Presidents and members of Council, an election shall be held for such vacancy, and the person who has the highest number of votes in each case shall be held to be duly elected."

In supporting the motion Mr. Hughes entered at some length into the causes which had resulted in the members seeking for a reconstruction of these laws. It was the first time in the existence of the Society that the members had ever demanded the holding of a special meeting, all meetings of this kind having hitherto been summoned by the Council; and the fact was gratifying, inasmuch as it showed that there was real vitality in the Society. A requisition, in which every point required by the laws had been complied with, had been sent in, signed by the requisite number of members, and in receiving that requisition the Council were bound (hear, hear) to call the meeting, whether they approved of the alterations intended to be made in the laws or not. Their duty was to call the meeting according to the law bearing on this point, and to do so when required, even if it were for an illegal purpose; but the Council deliberately ignored their duty by not calling the meeting upon the first requisition, and treated the gentlemen who signed it with disrespect, and they have not even yet informed them why it was not accepted. He had had more than one legal opinion upon the subject of Law VI.; the opinions being that the Council were bound to have called the meeting. The requisitionists received a very significant snubbing; but they were not to be snubbed, for they set about having a second requisition, in response to which the Council had generously given them an hour and a-half to consider the proposed alterations of the laws of the Society. He did not think it necessary to propose a direct vote of censure upon the Council for such conduct; for the objections of the requisitionists lay against systems, not persons. He (Mr. Hughes) then spoke of the three principles sought to be introduced by the reforming party, viz.:—First, that in future the members of the Council and officers shall be nominated and elected openly by the members; second, that they shall serve only for a limited time; and, third, that they shall not be eligible for re-election until after the lapse of one year. He spoke of the invidious task put upon the Council of selecting those of their fellows who should be made to retire, and those by whom the vacant places should be filled. If the retirement of members of the Council were determined by a fixed law no grievance would be felt when it came to a member's turn to retire. The Council, he was aware, selected its nominees by ballot; he asked that that which was now done by the Council should be done by the members of the Society. The desirableness of limiting the term of duration of members serving on the Council might be understood when he informed them that one member of the present Council had been sixteen years in office, and another had been no less than eighteen years. It was their desire that such honours or such duties as were connected with the office of councillor should be open to the members generally.

Dr. Mann seconded the motion. He spoke of the allegations that had been made respecting the motives governing those by whom the requisition had been got up; but he could say from personal knowledge that he had never known motives freer from anything of a personal kind, and more thoroughly honest and for the good of the Society, than those by which the requisitionists had been actuated. The existing laws were confused and antagonistic, and it was felt that they ought to be reformed.

Mr. Henry White moved as an amendment:—

"That a committee be appointed, consisting of six members of the Society chosen by the meeting and three members to be nominated by the Council, to revise the laws of the Society and report to a general meeting."

He objected to piecemeal legislation, which would be the case if the laws just proposed were adopted. Admitting that the laws were imperfect, he said that the Society had subsisted upon them for twenty-one years, and he thought that they might still go on with them. But, although on the whole he considered the laws objectionable, he thought that members of the Council should not be compelled to retire after three years' service.

Mr. F. Bedford seconded the amendment.

Mr. Bird desired to say a few words in opposition to the amendment. The requisitionists were simply desirous of meeting together to discuss the laws, and there was a feeling that the members had been treated with a want of courtesy. Many of them felt, too, that the authority of the Chairman had been exercised in a way that was not agreeable—that they had been ruled somewhat too sharply. They wanted a little friendly conference respecting laws which hung like fetters upon their necks, and an attempt had been made to deny them this right.

The Chairman explained that as soon as he had received the first requisition he had sent it to the Secretary; but, as this occurred during the Christmas holidays, some delay in the delivery of it had occurred.

Mr. S. Fry thought some alterations in the laws were required, and supported the amendment of the Council.

Mr. J. R. Sawyer called the attention of the meeting to one point that was being overlooked. It had been proposed at the last meeting that, later on during the present evening, a motion was to be made for the revision of the whole laws of the Society, and if the Council had really been desirous of revising the laws there was ample room afforded by that motion. Speaking of the proposal of the Council to nominate a certain portion of the revising committee, he said that they had no business, as a Council, to nominate any members whatever.

Mr. Hooper supported the amendment.

Mr. N. K. Cherrill advocated the right of country members to participate in voting. This class formed two-thirds of the Society, but by the existing laws their claims were ignored. He thought that the proposal to limit the term of office for three years was merely intended for the supplanting of their President. The three points of the requisitionists were pernicious.

Mr. F. Howard thought the last speaker had lost sight of the real point at issue, which was the proposing and electing by the members of the Society themselves of those that should be the governing body. That was the vital principle contended for.

Capt. Abney said that if the resolution were carried it would be equivalent to a slight upon the Council.

Mr. W. J. Stillman considered that if the amendment were adopted the revision of the laws would be referred to a committee who would have neither instructions to guide them nor time in which it should be carried out. They had no guarantee that the matter would ever be brought up again.

Mr. F. W. Hart combated the idea that the requisitionists desired to force their laws upon their fellow-members. He considered it essential that the country members should have a voice in the management of the Society.

Mr. Mayall said that this was a storm in a teapot, and the members should be very chary of altering the position of the President.

Colonel Stuart Wortley spoke of the desirableness of having a "house-list" prepared by the Council, and avowed his intention of voting for the amendment. He considered Mr. Cherrill entirely wrong in what he had said about the President, and characterised it as an attempt to create a prejudice.

Mr. Hughes replied to what had been said, after which

The Chairman put the amendment to the meeting, when there voted—

For the amendment	22
Against	28

The Council's amendment was therefore declared to be lost. He (the Chairman) then put Mr. Hughes's motion for the alteration of the laws, when the votes showed—

For Mr. Hughes's motion	30
Against	23

The motion was declared to be carried.

The meeting was then constituted the annual meeting of the Society.

The minutes of the previous meeting were read and confirmed.

The Treasurer's report was read and accepted. It showed a cash balance of £171 1s. 3d. in favour of the Society.

The PRESIDENT congratulated the members upon the improved financial state of the Society.

The report of the Council was then read and adopted.

The next business was the election of officers and council.

The PRESIDENT said that he felt he would be wanting in self-respect if, after the vote which had recently been taken, he were to continue any longer to act as their President. He would take that opportunity of thanking them for the support they had given him during the time he had held office. In placing his own and the Council's resignation in their hands he had to ask Mr. Hughes, as the proposer of the motion, which he construed into a vote of want of confidence, to occupy the chair, which he then vacated.

Mr. Glaisher left the room, followed by several of the members of the Council.

Mr. HUGHES having declined to take the chair, it was then formally proposed and seconded that he should do so, after which he assumed the seat vacated by Mr. Glaisher. He (Mr. Hughes) stated that the President and Council having resigned, he at the call of the meeting occupied the chair for the conduct of the rest of the business of the evening. After some observations upon the unusual condition in which they found themselves, he proposed that they should at once proceed to the business before them, which, as proposed at the last meeting, was the election of one Vice-President and five members of the Council, who would form a nucleus of the new Council.

Messrs. Mawdsley and Hooper were appointed scrutineers, and the following gentlemen were declared to be elected:—*Vice-President:* Mr. J. R. Johnson.—*Council:* Dr. Mann, Messrs. Frank Howard, J. A. Spencer, A. Goslett, and W. B. Woodbury.—*Treasurer:* Mr. W. S. Bird.

A general conversation ensued, after which

Mr. BIRD moved that the meeting accept the resignation of the President and Council. The vote which had been passed was, undoubtedly, one of want of confidence. The members had been treated in the most uncourteous and unbusiness-like manner.

Mr. STILLMAN seconded the motion. It was, he said, a fair fight between the Council and the members, and the former had been beaten.

Mr. SAWYER said that in this hasty resignation they had not treated the Society with respect.

Mr. J. WERGE questioned the right of the President and Council to resign in that summary manner. He thought that they ought to retain office until their successors were appointed, so that the Society should not suffer by being without an executive.

Colonel WORTLEY proposed that they be asked to retain office until the appointment of their successors.

Mr. F. H. WENHAM seconded the proposition.

The Chairman put it to the meeting, when there voted—

For Colonel Wortley's motion.................................. 13
Against it.. 16

The next business before the meeting was the appointment of a committee, on Mr. Hughes's motion, to revise the laws of the Society.

Mr. STILLMAN said that, as Mr. Hughes was in the chair, he (Mr. Stillman) begged to propose the motion instead.

This having been seconded, the following twelve gentlemen were appointed a committee for this purpose:—Dr. Mann, Colonel Wortley, Captain Abney, Messrs. Hughes, Stillman, Sawyer, Hart, Werge, Bird, Thomas, F. Bedford, and England. They were instructed to report proceedings on March 10th.

The general meeting was adjourned till the second Tuesday in March.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held in the Bible Society's Rooms, 5, St. Andrew-square, on Wednesday evening, the 4th inst.,—the President, R. G. Muir, Esq., in the chair.

The minutes of the previous meeting were read and approved, and Messrs. John Legget, William Anderson, John Stenhouse, D. Finlayson, W. B. Wise, and D. C. Simpson were elected ordinary members.

Mr. J. M. TURNBULL read a paper on *Durable Sensitive Paper* [see page 74], and showed a number of specimens both of paper and prints in various stages of manipulation.

Mr. PANTON had used Durand's paper for a considerable time, and found it remained white and good for several months if kept under pressure.

Dr. THOMSON had frequently used preserved sensitised paper, and found it answered his purpose admirably. He had some now in his possession that was sensitised in July last. It was still as white as ever, and printed well. In its preparation two baths had been used—the first, a sixty-grain solution of silver, which thoroughly coagulated the albumen and converted the chlorides of the alkaline metals into chloride of silver; and the second, a twenty-grain solution of silver, containing twenty-five grains of citric acid. The citric acid, he said, prevented discolouration of the paper, and gave it its keeping properties. Before printing, however, he considered that it was absolutely necessary to fume it with ammonia to get rid of the citric acid; and he had no doubt that if Mr. Turnbull had tried the fuming he would have found his paper answer better. The fuming generally discoloured the paper a little; but the darkening entirely disappeared in toning.

Mr. BASHFORD had used the collodio-chloride paper a good deal, but it discoloured rapidly and had to be given up.

Mr. PRINGLE said that it was no doubt desirable to get a paper that would keep good for some time; but he thought it more important to know how to use it properly. Some people seemed to think that printing was a mere mechanical process that could be done by anybody, and that all that was necessary was good paper and a fair negative. He believed that there was more art required for really high-class printing than was generally conceded, and thought that photographers generally did not give it the attention it required.

The PRESIDENT said the subject was one of such interest that it could not be fairly discussed off-hand, and suggested that the discussion be adjourned to enable members to experiment and bring up results at a future meeting.

The President's suggestion was agreed to.

Mr. TURNBULL then introduced a lamp which he had constructed as an improvement on that used in the sciopticon. The improvement consisted in the introduction of a third wick, standing thus /|\ between the two angular ones. His object was, first, to increase the light, and, secondly, to get rid of the dark shadow which the sciopticon, as at present arranged, casts on the upper part of the screen. The increase of light was very marked; but, unfortunately for the success of the lamp, the shadow on the screen was rather intensified.

Several modifications were suggested with a view to get rid of the shadow, and it was understood that the subject would be again introduced.

After the usual vote of thanks the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A MEETING of the above Society was held on the 5th December last,—Dr. Vogel in the chair. Two new members were admitted.

Herr Fritz Haugk, of Ballenstadt, wrote about the zig-zag lines which sometimes form on the collodion film and on silver in the baths. In his opinion they were due to deposits of bromide of silver, which was reduced to a metallic state during development.

To this it was remarked that bromide of silver was generally unreducable by photosulphate of iron, particularly after lighting. Herr Haugk had said that bromide of silver was soluble in the silver bath. This, however, was not the case with baths of the strength used for negatives (one to ten). Such denoted iodide of silver, but not a trace of bromide.

Herr FRAASTUDTER, of Rawicz, recommended that albumen paper given to blistering in small pimples should only be treated in cold fluids, toned in a cold bath, and never dried over a spirit lamp. He had never been troubled with these in winter working them.

Herr REICHARD said that he was as liable to these things as ever, but they did not come to any size, and disappeared entirely when the print was dry.

Herr O. LINDNER thought that, notwithstanding their appearance, they were apt after a time to develope a yellow spot. He, at least, had frequently observed such, and set them down to that cause.

Dr. Schaarwächter, of Uymwegen, wrote regarding albumen plates, moved thereto by some statements of Dr. Vogel's relative to Edwards's enlarging process. Dr. Vogel had said that he thought the coating of collodion put on previous to that of albumen a superfluity, and that Dr. Schaarwächter held to be an erroneous opinion. He had made some experiments with albumen years ago, and found that a first coating with collodion which was dried, washed, and then covered with a film of iodised albumen, gave cleaner images and rendered the film more sensitive than if merely coated with the albumen. In his opinion the under-coating of collodion rendered the denser layer of albumen more penetrable and susceptible to the action of the developer. A better method still was to coat the glass, first of all, with a very dilute albumen (1 to 300), then with collodion, and, last of all, with the iodised albumen. If Edwards used an iodised collodion for his under-layer it must have been with a view to obtaining strong images, such as plain collodion would not have enabled him to get, or only when the albumen was so charged with iodide as to look, before silvering, of a golden yellow hue. Such an amount of iodising could not, however, be obtained if the under film be perfectly dry when coated. A very acid silver bath was naturally requisite, otherwise the albumen might be dissolved. The acid acted as a coagulator. For the same reason the developer must also be strongly acid; and, to prevent veiling, an addition of citric acid to a large quantity of acetic in the pyrogallic developer was much to be recommended. The image was fixed with hyposulphite, in the proportion of one to four. Should the albumen film be hard, and in drying show a disposition to crack, then some drops of ammonia ought to be added to the hyposulphite. On the other hand, if the film looked weak and showed a tendency to rise in blisters, some drops of acetic acid should be added to the fixing agent instead. It was better to use artificial light in printing glass positives on albumen—daylight, even when diffused, was usually too strong. Generally half a second sufficed for exposure in such, whereas by gaslight an exposure of from ten to fifteen seconds was requisite.

The SECRETARY so far disagreed with the writer of the letter as to think that the washing out of the iodide from the collodion film might have a much more important effect than was allowed for.

Herr Prümm then proceeded to read his paper on the Dubroni apparatus, as arranged at last meeting. In doing so he remarked that this camera was carefully arranged, thought out to its minutest details, and that its parts were fitted with the utmost care. If it were remembered that within that small box everything requisite for taking a picture was contained, the price of it (300 francs) would not seem extravagant. The details of the apparatus it is hardly necessary for us to give, as having so recently described at length that of Dr. Stein. To all appearance, however, Dubroni's is the more compact of the two; and we notice that in our report there is a great improvement, in that he uses a small india-rubber bulb syringe for injecting his liquid, by which they are contained, it would seem, when not in action. The apparatus was shown and worked by Herr Prümm, who also exhibited some negatives taken by it, and the ingenuity of its construction was fully recognised by the members present.

There does not appear to have been any decision come to, however, as to which of the inventors should claim priority.

After some further conversation on minor matters the meeting was adjourned.

Correspondence.

THE APPROACHING EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—MEDALS OF PROGRESS.—IRON DEVELOPER FOR MOIST PLATES.—RETOUCHING VARNISH.—GLAZING CARTES.—MATTOLEIN.—A PAINFUL CONFESSION.

MY readers must permit me to remind them of the approaching exhibition of the Photographic Society of France, which will open in May, in the Palais de l'Industrie, at Paris. They will find full particulars of it in one of my back letters. This exhibition of photography remains open for three or four months, and is visited by thousands and tens of thousands of persons. It is, in fact, the finest annual exhibition of the kind in Europe. All nations contribute, and it is to be hoped that England will be properly represented. Exhibitors pay for wall space, and their works are fairly hung. Medals are awarded by a jury appointed partly by exhibitors themselves. All is said to be fair and above-board, and properly managed. I hope to visit Paris in May, and write a brief report of this exhibition.

Amongst the medals are to be medals of progress. This is as it should be. Why does not our own unfortunate Society take the hint? Certainly not because we cannot produce candidates for such an honour. Suppose a medal of progress had been offered to Mr. R. M. Gordon for his perfected dry collodion process, and to Mr. Burgess, for his gelatino-bromide emulsion, on the condition of the full publication of details, should we not now probably be in possession of their secret *modus operandi?* And suppose Colonel Stuart Wortley had received a medal of progress for his strong alkaline developer, would he now be holding back two more important novelties, simply because photographers are ungrateful? Depend upon it there is nothing which would so effectually stun the growing tendency to secretiveness among photographers as the offer of a medal of progress from the leading photographic society on condition of full and free publication of the secret. When will our London Photographic Society bestir itself, and strive in earnest to do some good for the art? What would such medals cost beyond a small fractional part of its income? And where would be the difficulty in awarding them if *members generally* were permitted by the "powers that be" to have a voice in the matter?

Some few weeks ago I was telling my readers about a grand discovery in photography which had been made by a M. Rougeon, of Brest, and was announced by his friend M. Marival in the columns of *Le Moniteur*, when we were to have full particulars "in our next," which, however, have not yet appeared. Strange to say, M. Rougeon has been at Redon practising as an itinerant portraitist, but I had the misfortune not to make his acquaintance. He is an operator of the house of Legendre, at Brest.

M. Jaubert, of Marseilles, writes to tell me that he is still using iron in the development of moist, albumen-preserved, bromo-iodised plates, and prefers it to pyrogallic acid. His plan is first to dip the exposed plate in a salt of nitrate of silver at one and a-half per cent. (about seven grains to the ounce), and then pour over it a ten-grain solution of iron. The image comes out slowly, requiring ten minutes to develope, but is very soft and harmonious, and perfect in its details. The plan reminds me of Mr. Gordon's original mode of developing his gum-gallic plates.

The same gentleman sends me a *carte* which he has glazed by the following simple means, which he thinks may be useful to some of the humbler brethren of the craft. He first applies a thin solution of gum arabic in diluted alcohol to the print, and, when this is dry, pours a little plain collodion over it; after which he passes the print through the rolling and embossing-presses. I enclose his specimen to our Editors, to examine and comment on if they choose. It is a group of three of the *belles* of Marseilles, where, from personal observation, I can vouch for there being a larger sprinkling of female beauty than in this part of France.

M. de Potok publishes the following formula for making retouching varnish, which he says was given to him by his distinguished friend M. Victoire, of Lyons, and is the same which is sold in Germany at a high price under the name of "Mattolein"—(beware, dear reader, lest any German adventurer should beguile you into buying a lot of it). It consists simply of two parts of picture varnish and three parts of highly-rectified essence of turpentine mixed together, to which you may add, if you choose, for the sake of perfuming it, a little essence of lavender.

A very happy idea has just occurred to M. A. Thaust, an amateur, of Toulon, which he has hastened to commit to print. He reminds us that many years ago a certain Monsieur B——, finding a mass of confused notions current on the subject of the process of Daguerre, took it in hand to write a little book, in which the most charming simplicity was evolved out of chaos. He suggests that our present processes have now got into similar confusion, and that it is high time for a second Monsieur B—— to come forward and reduce things to something like order and system. But I am afraid this second Monsieur B—— will have a tough job of it unless he can throw a little more light upon the theory of the latent image than we have at present.

Life in France, although deeply tinged with rosy hues, is not all *couleur de rose*. It has a *few* drawbacks. If one live under a bright sky, and breathe a pure air; if one be not poisoned by adulterated food and drinks; if one's coals be not half made up of incombustible rubbish, one's wine half water, one's reels of cotton forty per cent. short length, and one's pounds and pints incomprehensibly under the imperial standard; if one's pocket be not picked three times a-week; if one be not garotted by ticket-of-leave men, nor crushed under the wheels of an express train going at sixty miles an hour; if one be not swindled by managers of banks and companies, and by fraudulent trustees; and if one do not meet at large in society gentlemen who in France would be seen sweeping the streets of Toulon with a heavy shot chained to their ankle—still there are drawbacks to living in this privileged country. In the first place, no one seems to understand the value of time. Last November I sent a case containing some bottles of collodion to Milan. There is direct communication all the way from here by rail, and yet that case was twenty-five days in reaching its destination.

But the greatest trouble of all to me is the pain of having to refuse letters from correspondents in England which are overweight or insufficiently stamped. Every day this has happened during the past week. If I did not make it a rule to refuse them all indiscriminately I should simply be ruined; and if my correspondents do not receive a reply they may conclude with certainty what has happened. The refused letters are not returned to the writers, but go to Paris, where they lie for a time and are then destroyed. A letter to France should be written on the very thinnest of thin paper, and be put into the thinnest of thin envelopes; it should not exceed the length of a telegraphic despatch, and should have three penny stamps put upon it. Pray attend to this, kind correspondents, or else do not write to me at all, for you will only lose your labour. One may send a great coat by post, open at the ends, for a mere trifle; but a letter must not exceed ten grammes (154 grains) in weight.

Such is *one* of the petty regulations with which the French government harasses its subjects, and exasperates them with a frenzy which takes ample vengeances when a revolution comes; and all this for the sake of a few thousand francs per annum gained to the revenue by letters overweight, the postage on which is now trebled!

Redon, February 6, 1874. THOMAS SUTTON, B.A.

THE EDINBURGH PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Your esteemed contributor, "A Peripatetic Photographer," has some remarks, in the last number of your Journal, which might lead people to believe that the Edinburgh Photographic Society has a tendency to discuss what he calls "theological dogmas." To show the correct standing of the Society, allow me to make a short statement.

As a recognition of the national religion, the law has set apart the Sabbath as a day of rest from the ordinary business transactions of life. In consequence, trades and professions—irrespective of individual beliefs —show at the same time self-respect and courtesy to the nation by not breaking the law, at least in a manner offensive to the public. But if an individual does outrage public decency by breaking that law in face of the nation, and parades the fact in the newspapers, surely the body to which he belongs may, without impropriety, express their disapproval of his act. In the matter in question, the Edinburgh Photographic Society (with the exception of one individual) merely signified their disapproval of such an act. There was no discussion of "theological dogmas." "Remember the Sabbath Day" is a commandment; but it is also a law of the land.

"A Peripatetic Photographer" may rest assured that the Edinburgh Photographic Society is quite competent to conduct its business with due self-respect without wishing to discuss subjects with which, as a body, they have no connection.—I am, yours, &c., SCOTTICUS.

February 9, 1874.

P.S.—The above is written in defence, not in attack; and should give no offence to the "advanced thinkers," as they style themselves.—S.

EXCHANGE COLUMN.

An organ accordion and stand, value £6 6s., quite new, also stereoscopic camera, and pair of Vogel's double combination lenses, for exchange. Wanted, dark tent, bellows camera, and lens, about half-plate size or larger.—Address, W. H. PAGE, 3, High-street, Wainfleet.

ANSWERS TO CORRESPONDENTS.

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

SYNTAX.—Thanks.

D. E.—We can scarcely agree with you in your estimation of the portraits taken at Alexandria. They are not "brilliant;" they are merely hard and patchy. They are returned as directed.

PLANO-CONVEX.—From some observations in the present number it will be seen that, by a modification of the iron printing processes, negative as well as positive images may be obtained.

S. S. W.—The patent is worthless. The use of a concave lens between the object-glass and the eyepiece has been long known, and much has been written on the subject many years back.

J. R.—Having had little practical acquaintance with the process in question, and having never encountered the peculiar kind of defects apparent in your negative, we cannot give a suggestion as to their origin. Did the collodion contain all the bromide in a perfect state of solution?

"QUEBEC."—1. A press suitable for work of small size may be had for about ten pounds. Very small presses can be obtained at a much lower price.—2. A weak solution of india-rubber will ensure the adhesion of the film to the plate.—3. For particulars of the heliotype process, and other processes of this class, see pages 312 and 323 of our last volume.

T. HUNT.—1. The action in the catalysotype is not catalytic at all. The iron is decomposed and forms protonitrate, which, acting upon the silver present, reduces it, and thus forms the image.—2. A Buckle's brush is formed by a tuft of cotton wool inserted in one end of a wide glass tube. It is drawn in, and retained in position, by the loop of a string passed through the tube.

YOUNG EXPERIMENTALIST (Edinburgh).—The neutral oxalate of potash used by Mr. Willis in his process of printing may be prepared by neutralising a hot concentrated solution of oxalic acid with a hot concentrated solution of carbonate of potash. The salt thus formed is different from the binoxalate of potash, which may be prepared by adding to the above mixture as much more oxalic acid as was originally used.

HISTORICUS.—Having the book in your possession, we suggest that you look carefully through it for the dates required We are always desirous of assisting inquirers. but we cannot be expected to devote our time in searching for that which you have equal facilities with us for ascertaining. In reply to your second query we would advise you to use ammonium salts only in your albumen. There is no advantage to be derived from the mixture.

J. E. G. F.—It was desirable to be informed as to the intended aspect of the studio; but we shall assume that you have a choice of aspect. The lean-to studio will be an excellent form provided the slope of the roof is towards the north, or even within a few points of the north. The sitter can then be placed at either end of the room. If an east or west position only can be secured, then a ridge-roof is preferable, so as to permit of portraits being taken at any time of the day, and also admitting of the portraits being lighted from either side. With regard to the blinds, if the lean-to roof be adopted one set of dark blinds is all that is necessary. With the ridge-roof a set of dark blinds may also be required, so as to stop out direct sunlight, if requisite.

RECEIVED.—"A. J. W;" W. E. Batho (in our next); *The Sciopticon Manual* Second Edition; *Manual of Photography*, by Capt. Abney. Reviews of the latter and other works next week.

POTASS.—A correspondent who has had much experience in making oxygen, has suddenly encountered a difficulty from which he desires extrication by the aid of some brother reader. He says:—"Yesterday, I put a pound and a-half of oxygen mixture (chlorate of potash, eighteen ounces; oxide of manganese, eight ounces) into a Pumphrey's dry conical retort, and put it on a fairly good fire. For the first ten minutes gas came off freely as usual, then it stopped *suddenly* and refused to give off any more. I increased the heat, shook the retort well, and at last took the top off. I found the top of the retort *wet;* when I inverted it, *dry* mixture fell out. I put a little fresh mixture in, but it would not give off any gas at all. Can any one suggest a cause?"

PHOTOGRAPHY AT THE ROYAL INSTITUTION.—On Friday next, the 20th inst., Mr. Vernon Heath will deliver a lecture at the Royal Institution *On the Autotype and other Photographic Processes and Discoveries.* We understand that a practical demonstration of the processes will be given.

TINTED PAPER.—We have received from the French Albumenised Paper Company (32, Newman-street, Oxford-street) samples of their paper, both tinted and white. The former is of a very quiet, agreeable pink tint, and both it and the white sample produce good prints. We used the acetate toning bath when making the trial.

THE PHOTOGRAPHIC SOCIETY.—The metropolitan photographic journals contain evidence that the Photographic Society of London is menaced with revolution or dissolution. If both were to befall it the interests of science would hardly suffer, since a more singularly inefficient organisation, under the guise of a scientific body, it would be difficult to find, or one whose results in the scientific world are so trivial. It is difficult indeed to conceive that a society into whose hands, *faute de mieux*, the recognition and fostering of research in so important a branch of science as photography has fallen, should have done absolutely nothing for so many years but organise itself into a pocket borough in the direction of which no man of eminent scientific capacity takes part; which not only has no scientific reports or even investigations, but seems to care only to make of itself a weak mimicry of an art club the chief objects of which are to prove that a photographer ought to have a chance for the Royal Academy, to discuss the most effective style of getting up portraits to revive the trade demand, and to discuss such questions as to whether portraits may be retouched or not, and whether the printing of a photograph from a half-dozen negatives, more or less, is to be regarded as a work of design or not. It is not sufficient to put the names of two or three well-known men of science on the council of a society if the society show no care for science; and if the Photographic Society can do nothing more to merit the nominal position which it holds (without filling it) it is time that it should retire and give place to another. Photography has now become one of the most important aids to research in many fields of science; every new discovery which shall develope this assistance and make its efficiency more complete is of importance to the whole world—of an importance which makes it almost incredible that the Photographic Society should not only take no part in the investigations which would lead to discovery, but should never even take recognition of them even when made, while the petty jealousies of the dominant clique have driven out of the Society most of the really capable and successful investigators who have ever been in it. If the efforts at reform now being made should lead to success, and the Society become what it should be, a scientific body, so much the better; but if not, it is time that some new organisation should be formed to take in hand seriously the exploration of the still untried fields of chemical research, and make photography a real branch of science, and not deal with it merely as an amusement or a trade.—*Nature.*

METEOROLOGICAL REPORT,

For the Week ending February 11, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rainfall.
5	30·64	SW	34	35	37	33	—
6	30·54	SE	—	28	32	27	—
7	30·36	S	—	29	46	26	—
9	30·33	W	—	29	38	45	—
10	30·54	ENE	—	23	36	27	—
11	30·49	E	—	25	—	23	—

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 720. Vol. XXI.—FEBRUARY 20, 1874.

EXPERIMENTS WITH NEGATIVE NITRATE BATHS.

Probably there are few of our readers who, having used a nitrate bath for a considerable time, have not observed, upon allowing it to remain at rest for a day or two, a crop of numerous, very minute acicular crystals lining the receptacle in which it has been allowed to stand, and doubtless many have been curious to know of what these crystals consisted. They generally present the appearance of colourless transparent needles, refracting light very brilliantly. They have usually been supposed to be iodide of silver, either alone or in combination with nitrate of the same metal in the form of an iodo-nitrate; but, so far as we are aware, they have never been subjected to strict examination.

Very recently, in conversation with a friend—a careful and most observant amateur, Mr. Warnerke—we were informed by that gentleman that he had ascertained these crystals were nothing more nor less than *fulminate of silver*. Assuming this statement to be correct—and from a single experiment with a very small quantity of the substance we have been able to collect we believe that this will be found to be the fact—it becomes interesting to know how the compound in question is formed.

Upon treating a solution of silver in excess of nitric acid with alcohol, and applying heat, rapid decomposition of the latter ensues, with evolution of nitrous gas, and upon the cooling of the fluid fulminate of silver separates in considerable quantity. It requires, therefore, no great stretch of imagination to conceive that that which takes place readily by the application of heat may go on slowly in the cold. The quantity of the substance formed in an ordinary bath is so exceedingly small—probably not exceeding in weight more than a grain or two in a bath of half-a-gallon or upwards—we have not been able to make a proper examination; but we hope to avail ourselves of an opportunity of so doing, when we shall recur to the matter.

While upon the subject of the nitrate bath, we may mention another circumstance of recent occurrence which is worth noting, although we cannot at the moment offer an explanation of it.

An old bath which had been a considerable time in use, and which had ceased to give good pictures, was evaporated to dryness with a view of fusing the nitrate contained in it. This operation was carried on in a large open capsule, fresh portions of the bath being added as the evaporation proceeded. By an inadvertence the heat was permitted to continue longer than was intended; and upon entering the laboratory after the lapse of an hour or so the room was found to be full of acid vapour. This was not a matter of surprise, as the nitrate had become fused, and remained in this state probably for some time; but the acid vapour which permeated through the whole apartment appeared to have carried silver with it to all parts of the room—not to a greater extent in the immediate neighbourhood of the heated capsule than in the parts of the room furthest removed from it, every particle of horizontal surface being apparently equally affected by what we must consider as a shower of acid vapour containing silver in a volatile form. Sheets of paper and the wooden counter and shelves of the laboratory were equally stained and discoloured with the well-known silver stain.

There was no question here of the splashing up of the semi-fused mass, but an *uniform coating all over the room*. In the case of a writing table many feet distant from the bend upon which the silver was fused, the blotting-pad was tinted as perfectly as though it had received a coating of paint; sheets of paper thrown one upon another assumed an uniform chocolate colour; and where a penholder had been laid upon a sheet of paper a clean, sharp mark showed where the silvery shower had fallen—all evidencing that the laboratory had been filled with a spray, so to speak, of silver in a volatile form, which had deposited itself on everything in it, even to the most distant parts of the room. The sheets of paper thus discoloured, though appearing uniform in tint when viewed at a short distance, showed, upon close examination, that the discolouration was produced by innumerable minute specks in almost absolute contact with one another.

That the silver compound, whatever it may have been, had really fallen in a shower, and was not merely condensed upon the surface of the objects subjected to it, was conclusively proved by the appearance of an old photograph which had been fastened by a few nails to the wall on one side of the laboratory. This print had never been carefully mounted, and was rucked and cockled in various places. The projecting portions upon their upper sides had been stained in the same way as the other articles in the room, but all *vertical* parts of the print were absolutely untouched.

It would appear, therefore, that in evaporating a portion of the silver was absolutely *volatilised* with the acid evaporated, in the same way as it is affirmed that salt (chloride of sodium) is carried over with the watery vapour in the distillation of a solution of it, *e.g.*, in sea water.

PATENTED INVENTIONS.

No. IV.—PHOTO-ENAMELLING.

A Gallic brother, M. Paul Marny Godard, of Paris, has obtained a patent for the application of carbon printing to porcelain or other similar substance, which, after the picture is developed, receives a coating of transparent enamel or vitreous glaze, and is fused by being baked in an oven.

The patentee takes a picture by the ordinary carbon process, developing it upon porcelain, delf-ware, biscuit, enamel, or similar materials. In order to accomplish this he prepares his sensitive carbon paper or tissue by means of a solution of glycerine, water, and colour, pure gelatine melted in a water bath, and a solution of bichromate of potash. This bath is kept at a temperature of 90° to 100° Fah., and upon it one side of a sheet of paper is floated. No particulars whatever are given respecting the proportions in which these ingredients are to be mixed.

Paper prepared in the foregoing manner is exposed in the printing-frame under a negative, and the paper is subsequently pressed in contact with the surface of the material upon which it is to be developed, which operation is effected in the usual way by placing it in water heated to the temperature of 100° Fah. The patentee says that mineral colours should be used in these reproductions, as vegetable colours would be destroyed by heat. The picture thus obtained is covered with enamel or vitreous glaze, and is baked in an oven.

The specific claim is thus stated:—"I hereby declare this invention to consist in, and I claim the mode of, reproducing drawings, devices, and designs on porcelain, delf-ware and such-like materials, substantially as above described and set forth, by means of the carbon process above mentioned."

Several years ago, while the Autotype Company was in a state of embryo, having its home at Brixton, we suggested to Mr. J. R. Johnson the possibility of obtaining burnt-in photographs by a process similar to that now patented. The objection made was the certainty of the gelatine with which the pigment was incorporated puckering up under the great heat (requisite for fusing the enamel or glaze) to which it would necessarily have to be subjected. We imagine, although at this moment we cannot recal the precise circumstances, we have met with the suggestion more than once in the course of our photographic reading.

If the patentee has succeeded in obtaining a vitrified image according to the process described in outline, it is to be regretted that he has not given the necessary details to enable other photographers to do so likewise.

The nature, constitution, and mode of applying the glaze are not communicated; hence, in accordance with a principle in patent law that everything claimed shall be minutely described, the absence of such a description in this case might tell seriously against the validity of the patent, assuming that the patentee had been able to overcome the difficulty arising from the puckering up and destruction of the film.

But the most formidable obstacle with which the patentee will have to contend is the ability of producing photographic enamels by means of three other processes, all superior as respects simplicity and rapidity to any method of carbon printing that can be adopted. We allude to the substitutionary process in using a collodion transparency; to what is well-known as the "dusting on" process; and to printing by the lichtdruck or collotype process, using an ink containing a vitrifiable pigment. We have seen high-class results produced by all these methods. The first two can be worked by artificial light; the last, when the printing surface has once been obtained, is effected by the ordinary process of lithographic printing.

No. V.—A REVOLVING CAMERA.

Provisional protection has been obtained by Mr. Hodgson, of Sheffield, for a method of simplifying cameras by doing away with the dark slides or changing boxes which are required when working at a distance from home.

The patentee puts the drawbacks to dry-plate cameras and dark slides in an exceedingly strong light in his preamble, which we give in his own language:—

"This invention relates to cameras for taking photographs in the studio or in the open country, and has for its objects to supersede the present form of cameras with their cumbersome dark slides and focussing screens, which are continually getting out of order, and the intricate or complex arrangements of ordinary dry-plate cameras, for getting the prepared plates into position without damaging the film thereon, or breaking the glass plate intended to receive or carry the negative picture, and to take or produce a number of pictures more rapidly and at less cost than by any other photographic apparatus hitherto used for the purpose."

Now, in point of fact double dark slides are *not* "cumbersome," and they do *not* "continually" get out of order. Dry-plate cameras are neither intricate nor complex in their construction; and no difficulty is ever experienced in preserving the plates from fracture or in the protection of their films when placing them in position. We are enabled to say so much as the result of our experience during many years' practice. The patentee's experience must have been acquired in connection with singularly ill-devised and worse-made instruments.

The means by which he proposes to carry out the objects of his invention are as follow:—He constructs a hollow drum, or the skeleton frame of a drum, or of a many-sided figure of suitable materials and dimensions. In the top and bottom discs of this drum grooves are cut or formed thereon for the insertion therein of any convenient number of prepared glass plates, either wet or dry, on which portraits or other pictures are to be photographed; the skeleton frame may also be formed with any number of sides, according to the size and number of the plates desired to be placed therein, leaving a narrow slit or opening behind or opposite to a fixed plate of ground glass to focus through. The angle pieces of the said skeleton frame are properly grooved to receive and hold the prepared glass plates, these arrangements being made so as to form a figure with regular and equal sides, or nearly so, in order that each prepared glass plate may in succession be brought by the motion or turning of the drum into the exact position previously occupied by the focussing-glass. This drum is then inserted in a box or case, and is so pivoted therein that it can be freely revolved or turned by a handle or finger fixed on the upper pivot outside the said box. This box is provided in front with a sliding lens, and behind or directly opposite the said lens with a small strip or plate of yellow or other suitably-coloured glass, to focus through and to protect the prepared plates from the effects of the light thereon when revolving the drum. Securely fixed on the top or lid of the box, and centered on the said upper pivot of the drum, is a circular dial plate, on and near to the circumference of which, at the proper distances, numbers or figures are placed corresponding with the number of plates or sides of the drum; the ground or focussing-glass plate, being fixed in and forming one side of the drum, is always in its place, and cannot be easily damaged or destroyed. This focussing-glass the inventor designates "No. 1," and the prepared glass plate next thereto—say on the left-hand—"No. 2," and so on with the remainder of the plates in the drum following in the same direction. In operating this camera, the drum, which has been previously supplied with prepared glass plates, is turned or partially revolved by means of the finger placed over the dial plate and a ratchet wheel and spur thereunder, until the said finger points to or is over No. 1 on the dial plate, when the focussing-glass is in position behind the lens, and directly opposite the coloured glass in the box and the narrow opening in the drum; on looking through which coloured glass and opening so placed in line the picture is seen on the ground glass, and the apparatus is ready for focussing. When the focussing is completed the slide behind the lens is closed and the finger moved to No. 2 on the dial plate, which brings a prepared glass plate into position in the exact place occupied by the focussing-glass when it is ready to receive the image or picture, as previously seen on the focussing-glass. In this way the whole of the prepared glass plates in the drum are in succession brought before the lens and receive an impression or picture.

When different views are required on each of the plates in the drum, after taking the first view, as previously described, the finger and ratchet wheel are again turned round to No. 1 on the dial plate, when the focussing-glass is again behind the lens, and the apparatus is ready to focus another view. When this is arranged the drum is turned until the finger points to No. 3 on the dial plate, so as to present another prepared plate behind the lens, and the second view is taken, and so on for the remainder of the prepared plates in the drum, the sections on the drum serving the place of the dark slides at present used.

This apparatus may be made in different forms, the main or leading features being retained in each case. For example: in a camera for the studio where only one or two plates are required at one time, the "drum" may be only a quadrant or one-fourth of a circle or polygon, wherein the plate or plates are placed, leaving the adjoining quadrant an empty space, so that as the views are taken they are turned into this empty quadrant or space. For a stereoscopic camera the drum is fixed to revolve on a horizontal axis, the other parts being formed as previously described where the drum revolves on a vertical axis or on pivots.

The camera may be of any size or dimensions, and the inventor asserts that it can be produced at less than the present cost of similar articles, and be more durable. It may be made of wood, tin, brass, or other suitable material which will not warp or be otherwise injuriously affected by variations of climate. It may also be made of paper for a toy camera, with a bull's-eye lens, to exhibit small transparencies. Its construction being exceedingly simple, it cannot easily get out of order. It is very compact, portable, and light, always ready for use, and is therefore very suitable for tourists in taking stereoscopic and other views, cards for albums, and the like.

From the foregoing description many of our readers will agree with us in thinking that the "remedy is worse than the disease." Suppose, for example, that a photographer goes to the country with a dozen 12 × 10 plates secured in six double dark slides. These will make a comparatively small parcel; but suppose that the patent arrangement were adopted, and the plates arranged around the periphery of a drum, the diameter of this drum would require to be about three feet! Comment on this is superfluous.

DIRECT LARGE HEADS.

In taking large heads *direct* a very important point is apt to be overlooked by photographers. Portrait lenses, as usually constructed, are not properly adapted for producing pictures the same size as the original. Their principle of construction is based on the assumption that one of the conjugate foci—that is, the subject—is at a much greater distance from the lens than the other, or sensitive plate. The back and front lenses of a portrait combination are each constructed in a different way, and the object of the non-symmetricity of an objective of this kind is to meet the different angles at which the rays enter and emerge from the lens. The rule in respect to a portrait lens is this—that the front or bi-convex lens of the combination must be turned towards that conjugate focus which is at the greatest distance. In ordinary portraiture the front lens must be next the sitter.

It follows from this that, if a lens be constructed for portraiture in which one of the conjugates shall be longer than the other, it is unsuited for any other purpose, such as the production of an image the same size as the original. It is true that by the introduction of a small stop a portrait lens, or any other lens, will work under all conceivable circumstances; but we are now speaking of the efficient working of a lens with its full aperture.

But if, on the other hand, the attempt be made, as appears to have been done by some who have striven to produce works of the dimensions entitling them to be competitors for the late Crawshay prizes—if the attempt be made, we say, to produce heads *larger* than the original, then the optical conditions are entirely at fault. Nothing remains under such circumstances but to reverse the lens entirely, and to point the posterior element of the combination to the face of the sitter.

A portrait of the character referred to is really an "enlargement," although taken direct; and the optical laws which necessitate the back lens of a portrait combination being turned towards the transparency projected by a magic lantern upon a screen, equally compels the back lens to be directed towards the face of a living sitter when that sitter is situated at a greater distance from the lens than the ground glass or sensitive plate upon which the image is to be received.

We observe that an old friend has been making its appearance with a new face. The well-worn subject of an auxiliary exposure of the sensitive plate to coloured, or even direct *weak*, radiations, has been brought forward at the last meeting of the South London Photographic Society by Mr. Samuel Fry. Evidently Mr. Fry was not aware of the exhaustive experiments which have been made in connection with this matter, and which have, from time to time, been recorded in this Journal. The variation introduced by Mr. Fry on the methods previously proposed is the admitting of light to the plate through the lens after passing through a disc of opal glass. This, as will be seen, is only another means among numerous others proposed of subjecting the plate to the action of weak diffused light. Those of our readers interested in the subject will find it fully treated of in articles at pages 515 and 527 of our volume for 1872; meanwhile we may refer them to Mr. Foxlee's observations in our report of the meeting of the South London Photographic Society to be found in another page.

THE PRODUCTION OF ENLARGED LANDSCAPE NEGATIVES.

[A communication to the Manchester Photographic Society.]

It is not necessary for me to say anything about the great advantage of being able to move about more easily, cheaply, and with less annoyance with a small photographic outfit than with a large one, as it is too well known. I do not wish to be understood to say that enlarging is easier than taking a moderate-sized negative direct, as it is not so; for, at the least, three good plates have to be worked instead of one. The great advantage I consider to be that the tourist can bring the work home, where there are or should be, greater conveniences, and so make himself less of a slave during what should be a pleasant out, if the weather be favourable.

In the first place, let us consider the small negative. The definition must be perfect, especially in the two corners of the foreground. It must be good in a pictorial sense; for, though a large picture is superior to a small one, still, if it be not of a good subject, the smaller it is the better. The negative must have a full amount of detail in the shadows, and be vigorous without being too intense in the lights, only a small portion of which should be quite opaque, and this, if possible, should cut sharp against a deep shadow to give brilliancy to the picture. The negative must not have been printed from too often. If one which has been so used be examined with a magnifying glass it will be found to be full of minute black spots, caused by silver from the paper getting into the pores of the varnish.

Now a word about negatives to be taken for the purpose of enlargement. A good camera must be used with the best plate glass, the full size of the dark slide. No carriers should be used, as, in my opinion, they warp, and have a great deal to do with imperfect definition. It is of the greatest importance that the lens be the very best that can be obtained, and "especially it must cover the plate well." I find, on looking over my old eight-by-five negatives with a magnifying glass, that, though they are sharp enough for printing from, and as sharp as possible in the centre of the plates, still there is such a falling off in the definition towards the margins that they are unfit for enlargement. They have been done with opera-glass lenses and the front combination of a portrait lens. The process used should be one which gives a crisp image. Collodio-albumen comes first on the list; then the bromo-iodide dry plates, such as gum-gallic; next, wet plates and those dry ones with a crystalline preservative, such as tannin. It is advisable that a magnifying glass be used in focussing. Plates should not be varnished until a good transparency be obtained. Collodio-albumen will do without, and the other dry-plate and wet negatives should receive a coat of thin albumen while they are wet, which should be dried before the fire, as in varnishing.

I had almost forgotten to say anything about the size of negatives suitable for enlargement. I think it best not to make them too small, as they not only have to stand more enlargement to attain a given size, but they are less fitted to do so; for, as the size of the plate decreases, it is more difficult to judge of the quality of the image. I should recommend not less than half-plate nor larger than whole-plate size, the size of seven and a-half by five inches, commonly used by amateurs, being very suitable.

Now for the transparency. It should be made by contact printing on a plate larger than the negative, and of the same kind of glass, but thinner, for safety to the negative; for all but negatives on plate, thin, flat crown is best. The transparency must be full of detail in lights and shadows, and not too intense; it may be made by the autotype or collodio-bromide process, but transparent albumen films seem to find most favour at present. I will describe the albumen process as I have last practised it, and I must not omit to say that I got a great deal of information from a paper, published about the middle of last year in both the photographic journals, by Mr. Carbutt, an American gentlemen. Take the whites of four fresh eggs, and add thereto ten minims of glacial acetic acid in half-an-ounce of water. Stir well together a minute or two, leave half an hour, then strain through a piece of coarse white calico, and next through a piece of the finest calico; then add fifteen minims of strong liquid ammonia. Dissolve twenty grains of iodide of ammonium, ten of bromide of ammonium, and ten of sugar-candy in two drachms of water; add to the albumen and stir it well. Filter through a piece of moistened sponge cut to the shape of a cork, and fitted in the neck of a funnel. Polish the best side of a clean plate with a few drops of the albumen, using a piece of clean calico; warm the plate slightly, use the dusting brush, and coat with ripe, structureless, and thin bromo-iodised collodion. As soon as it is set put it in a dish of water, rock it until the plate is no longer greasy, then wash well under a tap; for, if the ether and alcohol be not entirely washed out, the albumen is coagulated, which causes marks in the film. Now drain two or three minutes with the bottom corner resting on blotting-paper, then coat with the iodised albumen; let the plate rest horizontally for three or four minutes, then flow the weak albumen into a bottle to be used for the first coat of future plates. Coat with the strong albumen four times, letting it flow from a different corner each time, and from the one where the collodion was poured from last rest this corner on a thick pad of clean blotting-paper, the top corner against a clean plate-box, with the film inwards. Let it rest thus for an hour, then dry off before a clear fire, and, when nearly cool, immerse half-a-minute in a thirty or forty-grain aceto-nitrate bath, moving it about all the time. Then wash well, immerse in a weak solution of salt, wash and flow with a three-grain solution of gallic acid, or, what is better, a strong infusion of black tea. Now leave the plate on blotting-paper as before, and if the room be tolerably warm it will soon dry. It is important that the plate be kept quite dry, or it will blister during development.

For exposing the plate under the negative I use one of the Autotype Company's printing-frames, with a spring back in one piece only. I lay the negative in the centre of the plate glass (which, by the way, is nearly half-an-inch thick); then the albumen plate, taking care that the film side is next to the negative; next, two or three thicknesses of orange tissue paper; and, lastly, sufficient printing pads to give the required pressure. The pads must not overlap the negative, or the larger albumen plate will be broken. Then the back is shut down until caught by the springs. Lay a focussing-cloth over the front of the frame, go into the light, and make the exposure to the north sky, which varies from two to fifteen seconds for alkaline development, the average exposure to a blue sky being five seconds at present; but I think it useless to lay down any rule, as everyone must find out his own exposures. I have no doubt that the magnesium lamp or the sciopticon would be the best thing to make the exposure with, as the light is always the same, and, the exposure once found, the density of the negative would alone have to be considered. The transparency would also be quite sharp even if the contact of the glass were not perfect, so doing away with the necessity of using plate glass.

Now we come to the development. I prefer the alkaline method, for it gives an image of more even density over the plate, and freer from surface stains, than when a hot solution of acid pyro. and silver is used. Make a solution containing ten grains of bromide of potassium and one drachm of liquid ammonia to an ounce of water; take the plate out of the frame, flow it with warm water, and rest it horizontally while three grains of pyro. are dissolved in an ounce of hot water, to which add five minims of the ammonia solution, and flow over the plate. If the image do not appear in about a minute add more ammonia very gradually, and if the exposure be right the proper amount of detail and density will be obtained without intensification; but if the plate be over-exposed the development must be stopped before all the details in the lights are out, and intensified with two grains of pyro., one grain of citric, and ten minims of acetic, acid to the ounce of water. Flow over the plate, and then add three or four drops of a ten-grain solution of nitrate of silver. If the image be very fully exposed use more silver; but if it have not sufficient detail in the lights warm the solution and keep the quantity of silver as low as possible. If a slight fogging occur at any stage of the development flow the plate with water, and rub lightly with a tuft of carded cotton.

The fixing must be done in a half-saturated solution of hyposulphite of soda, made milky with acetic acid. When developed by the alkaline method these plates require no toning.

And now we come to making the enlarged negative. I shall not say anything about the camera or enlarging room, but confine my remarks to the lens and process. First: What is the right sort of lens to use? I think that for anything containing no straight lines a single lens of not less focus than the length of plate to be enlarged will give the "sharpest" image. The lens must be reversed, or the marginal definition will be very poor. A doublet lens having both the combinations symmetrical is a very excellent lens for enlarging, as it works quickly. In my opinion there is none worse than a portrait lens, which, however, will do pretty well if it be a good one of moderately long focus, with a small stop, and reversed, which I must explain, for the benefit of beginners, does not mean turning the lenses round and in their cells as I once did, but turning the tube end for end, so that the cap of the lens is next to the larger plate.

And, lastly, the negative (of course there is nothing so convenient as the wet process) is developed with a weak, fully acid, iron solution, to which you can add some strong solution, if the plate be under-exposed; but if the lens be quick, the light good, and the transparency thin, I think the best results can be got on the ordinary collodio-albumen plates with alkaline development. J. Brier, Jun.

FORMULÆ FOR INSTANTANEOUS PHOTOGRAPHY.

The following are given in the current number of the *Bulletin Belge*, by M. Duchochois, as good formulæ for attaining the much-desired instantaneity which photographers often hear of but seldom reach.

First, the pyroxyline:—Mix sixteen ounces of dry nitrate of potash, two ounces of water, and twenty-eight ounces of sulphuric acid at 66° in a strong mortar warmed to 120° Fah. Immerse immediately in this solution, by small portions, as much cotton well separated as the liquid can cover, taking care that each tuft is well soaked before adding another. The dish should be kept covered, and the mixture stirred now and again, so as to ensure equal saturation, and the temperature ought not to fall below 140° Fah. After twelve minutes' immersion the pyroxyline should be rinsed rapidly in abundance of water until test paper shows no trace of acid. It should then be immersed in a very weak solution of bicarbonate of soda, washed further three or four times, and, when perfectly dry, placed for four-and-twenty hours in alcohol. Before removing it from the alcohol it ought to be well rinsed in it, and then allowed to dry spontaneously.

A pyroxyline for dry plates and emulsions is prepared thus:—

Nitric acid at 41°	4 ounces.
Sulphuric acid 66°	6 „
Temperature	150° Fah.
Duration of immersion	10 minutes.

The rinsing in alcohol may be dispensed with, its object being to dissolve the nitro-glucose, which is a necessary ingredient in dry plates.

The collodion is prepared by adding one equivalent of iodide and a half equivalent of bromide to about thirty ounces of plain collodion, according to these formulæ:—

Plain Collodion—

Concentrated ether	14 ounces.
Alcohol (absolute)	4½ „
Pyroxyline	3½ drachms.

Bromo-iodide Solution—

Alcohol at 90°	12 ounces.
Half equivalent of iodide of cadmium	1½ drachm.
„ „ „ sodium	1 dr. 17 grs.
„ „ bromide of „	1 drachm.

Mix the two solutions. With a well-settled plain collodion the iodine alone may be used, and it will be ready for use some hours after preparation. It gives more intensity, but is less stable, and decomposes more rapidly with most of the ethers of commerce.

The silver bath ought to be a strong one. It is commendable to employ a small quantity at a time, and to renew it often.

The developer presents some novelties, and is as follows:—

Water	150 ounces.
Sulphate of iron and ammonia	5 „
Sugar-candy	2 „
Sulphuric acid	1½ drachm.

MY EXPERIENCE IN TAKING DIRECT LARGE HEADS.

[A communication to the South London Photographic Society.]

Having heard from my father (the Secretary of this Society) that Mr. Aldridge was about to read a paper with the title of *My Troubles in Taking Large Direct Heads*, I thought I would offer a few remarks on the way I got my large heads for the recent Crawshay competition.

The idea did not occur to me till a few days before the date on which all pictures had to be sent in; therefore you will see that my time was very short, the more so as I was the only part of the apparatus that I had. Through the kindness, however, of one of the members of this Society that difficulty was soon overcome. Not having a dipping-bath for so large a plate I was forced to use a flat dish; therefore, now, having got apparatus and bath ready, I set to work—with what success you can judge from the two specimens I have brought with me.

In the first trial I placed my sitter in the centre of the glass house (which is about twelve feet wide), and found that the exposure was very long—in fact, about three minutes. I saw at once that that was too long, so, trying another, I placed the sitter this time close to the glass (side light), and then the exposure was shorter a great deal—in fact, less than one minute; and that I call very short, considering the time of year these negatives were taken, and the very foggy weather prevalent at the time for sending pictures to the exhibition.

The large head of a gentleman was only taken the day before the time for sending them in, at a little after nine in the morning. The exposure for that was about forty-five seconds, which in the summer on a fine day would be less than thirty seconds. That exposure cannot certainly be called long, especially with a lens (Ross's four and a-half diameter) that was not made for that sized head; and if you are going to say, as I read in one of the journals the other day, that "we must have enlargements because of the expense of the lens for the direct heads," I think the matter of expense has nothing to do with the question—Which are the best—enlargements or direct heads?

I also find in these large heads that if the blinds for shading are kept a long way off the sitter the shading is very easy indeed, for the face, to a certain extent, will give shading; and more violent shadows can be thrown on these heads than on the smaller size, and, therefore, more powerful effects can be obtained.

I think that enlargements for children are useful, as they cannot possibly sit the time required for the direct large head; but for adults direct pictures are far the best. Take, for instance, the large pictures at the recent exhibition on 20 × 16 plates, full length: what enlargements can come up to them for tone or natural expression?—for I contend that in enlargements there is a want of lifelike expression. Or, again: take the half-figures on same sized plates—who would wish for better? If the public want larger than these, I say that photography ought to go out of the field, and leave the artist on canvas with his brush to paint the large heads.

Enlargements are all very well for landscapes, where there is no expression wanted, but merely light and shade; then they are very useful indeed, as the time of exposure is a great point.

I think the slight want of sharpness which now occurs in the large direct heads (through the want of a large lens) is not so much an objection as the intense sharpness all over enlargements, which is what the enlargers are now striving for. There are a good many parts of the face which would be better for being slightly out of focus. Photographers must, sooner or later, come to prefer large direct heads to enlargements; and for my part, when the apparatus and chemicals for taking them have been improved, I can see no difficulty in doing them. Even now, in my opinion, there is something about a direct large head—perhaps the expression "lifelike" best expresses it—far preferable to an enlargement; and I hope that in this year's competition a good many more photographers will think so too—therefore, more competitors and, I hope, greater improvements. H. Garrett Cocking.

PRACTICAL REQUISITES FOR DRY COLLODION.

In his *brochure* on dry collodion processes M. de Constant gives some very interesting and useful notes on his experience which we think well worth presenting to our readers. Summarising his experience, he says that the following, amongst other things, are essential requisites for obtaining good work:—

1. The employment of a specially-prepared collodion, for which gun-cotton made at a high temperature is used, or else an old collodion, so that a highly-porous film may be obtained.

2. A preserver must be found which, besides acting mechanically as a conserver of the porosity of the film, must also contain chemical properties conducive to the keeping of glasses and to the furtherance of development.

3. This composition must be so prepared as to fulfil its work without importing elements of decay into the films, even if they should be kept for months.

4. The film must be easily re-moistened, so as to allow of sufficient permeability for the admission of the developer into the pores and its uniform action.

5. Without laying too much stress on rapidity, it yet ought to be sought by every means possible, to abridge exposures.

And, finally, the details, to their minutest tittle of the preparation of dry plates, ought to be carefully studied and practised until a handiness is acquired which will enable the operator to prepare them with rapidity, uniformity, and success.

In speaking more at detail upon these points M. de Constant says that, unfortunately, few people attach much importance to the choice of collodion, and some even say that any good wet collodion does equally well for dry plates. But this is a great mistake, and there can be no doubt that many have failed from ignoring this point alone; and now that so many makers, English and others, take care to provide for the wants of photographers in this direction, failure from such a cause ought to be inexcusable.

As regards the nature of the preservative, it is well known that dry plates will not keep long without one. And, in regard to the morphine process—which is a very watery one—the preservative hardly suffices to keep the plates for a few days. It follows that the base of the preservative ought to present, when dry, a resistance and density sufficient for its purpose, and yet not to be impervious, but rather helpful, to chemical action. In this last point of view the successes obtained by means of tannin, gallic and pyrogallic acids, are undoubtedly noteworthy; so also, although on somewhat different grounds, are the various coffee processes.

M. de Constant himself has been making researches in the direction of these hints, and believes that he has found a preservative which fulfils all requisites, and which he presents to his brethren. His process appears to be a modification of Ackland's albumenate of silver, or, at all events, that process gave him the germinal idea of his own. Instead of albumenate of silver he, however, coats his plates with a solution of plain albumen and gallic acid. The office of this coating is not so much to cover the film as to fill its pores, for the superfluous albumen is washed off. The interest in such questions is, however, just now somewhat slack; for, what with emulsions and ready-made gelatine films, the old-fashioned, laboriously-prepared dry plates are threatened with speedy extinction.

MY TROUBLES IN TAKING LARGE DIRECT HEADS.

[A communication to the South London Photographic Society.]

It is not often that a discussion introduced at these meetings is allowed to extend to a third night. The subject of *Enlargements* versus *Direct Pictures*, opportunely introduced by our friend Mr. Croughton, has excited so much interest, as witnessed by the articles and letters in the journals, that I think it would be a pity to let it drop while anything remains to be said upon the subject. Much of this interest is doubtless owing to the recent competition for the Crawshay prizes.

The principal speakers upon the two last occasions are both well known as being professionally engaged in enlarging. It is, therefore, not very surprising that they should, even in spite of an old proverb, have treated the matter as if there were only one side to the story. They have certainly enlarged upon the advantages of enlarging. It is to be regretted that none of those gentlemen who have carried off the prizes have been induced to take up the glove on behalf of the direct heads. I feel that I am but half a champion at the most, as I believe that after a certain point the enlarging process has the best of it. This point I am inclined to place at about half the size of life. It is for this reason that I have preferred to entitle this a paper on *My Troubles in Taking Large Direct Heads*, rather than damage the cause I espouse by my inefficient handling. I have also another motive: I believe that in the last competition the size of the face—or, as it is wrongly called in Mr. Crawshay's announcement, "the head"—namely, from seven and a-half to eight inches, considerably exceeds the average length of the "human face divine," even in male heads. Of course, in the case of the fair sex—always the most attractive part of a photographic display—the difficulty is much greater; so much so as practically to be prohibitive to those who object to the distortion inevitably resulting from making objects larger than the model. By the enlarging process it makes but little difference whether the face be increased to eight or eighteen inches—disproportionate distortion will not be the result; but in the direct heads it is far otherwise.

In the discussion that followed the reading of Mr. Edwards's paper I stated my objections to any comparison between the direct and enlarged heads of the larger than life size. Practically they were both enlargements, and under such circumstances I prefer those that were correctly labelled. I am a believer in large lenses up to a certain point, and it is to prevent their being overweighted in the coming race, as well as the hope that a record of my mistakes may be useful to those who travel the same road, that I have put together these few notes. Much has been said both for and against the proportions I stated as the standard on the last occasion; resulting, however, in an unanimity on the part of those who took the trouble to submit them to the list of actual measurement for which I had scarcely hoped. As the subject seems to possess interest I will give at somewhat greater length the usually-recognised proportions, and the way in which they are applied by artists.

According to the standard proportion the face is allowed to contain one-tenth of the length of the whole figure, measured from the sole of the foot to the crown of the head. The face itself is divided into three equal parts—or, as we say, into three noses—namely, from the bottom of the chin to the bottom of the nose; the nose itself; and, lastly, from the top of the nose to the parting of the hair. This is always called a "*face.*" Another measurement of the same length, from the parting of the hair to the crown of the head, completes the head, which is computed to be one-eighth of the figure measured as before. In practice the last measurement is generally found to be a little smaller than the rest. From this it will be seen that even in the case of a bald person, or where the head is covered, there need be no difficulty in finding the top of the face; it is only necessary to take a point the length of the nose above the nose itself. As Mr. Hubbard has correctly stated, the measurement by faces, which is held to be the more correct, is generally adopted by sculptors, who, as they more frequently represent the nude figure, are obliged to be very particular in their proportions. The other, although less exact, is found more handy by painters, and sufficiently true for their purposes. Thus the shoulders are said to be two heads across. The body, including the head and the legs, are each four heads in length. The head and chest to a level with the nipple are equal in length to the remainder of the body—that is, two heads. The legs, again, are divided into two equal parts at the patella, or knee-pan. It will be seen from this that the eight-inch face will give a head about ten inches. Now, whether we multiply the first by ten or the latter by eight, the result is the same, namely, six feet eight inches, as the height of the figure. It strikes me the recruiting sergeant would pronounce this rather above the average of humanity. I will not weary you with any more of these details. Should any of you wish to pursue the subject further I cannot do better than refer you to Flaxman's *Lectures on Sculpture*, to Bonomi's work on the proportions of the human figure, or to the numerous observations on the subject to be found in Leonardo da Vinci's *Treatise on Painting*.

The enlarging processes have certainly made much progress within the last year or two. No doubt something of this is due to the improved quality of the negatives themselves, especially where they are prepared purposely for enlarging. Still more, however, I believe, is owing to the superior beauty and fitness of the transparencies; for the old process of producing the enlarged prints from the negative direct may now be considered as obsolete.

Mr. Croughton has given us much valuable information on the treatment both of the transparency and the enlarged negative. As this information was of a practical character, and has since been supplemented by more useful details, I think we are much indebted to him; as, indeed, we must be to all who freely impart the knowledge they have gained at the price of great toil or experiment. Much of this information was not new to me, as I have for some time been working one of the so-called secret processes very closely corresponding to it. Mr. Edwards reserves his information on this subject until we have gone through the process of handing him five guineas each. I am afraid this little preliminary will prove an obstacle to most of us, notwithstanding the recommendation of our enterprising friend Mr. Tully, who has himself gone through the ordeal. It is, I believe, no secret that Mr. Edwards's plan depends for its success principally upon the transparency being made upon a structureless film of albumen. A similar film, I am happy to state, is about to be placed within the reach of every photographer by my friend Mr. Kennett, whose sensitised gelatine pellicle appears to me to fulfil all the conditions required. I have seen plates coated and developed by the new plan, and can truly say that I have never seen anything more simple or producing more pleasing results—at anyrate, in the hands of the inventor. The pellicle, as it is called, will be supplied at such a rate that two dozen half-plates may be prepared by the photographer at a cost of one shilling. Surely this is a step in the right direction.

As most people do, I have put off the consideration of my troubles as long as possible; but the story must be told. It was about the commencement of September last, on my return from a trip in the country, that the idea first occurred to me that I would compete with the rest in the smaller series of the Crawshay prizes—the four-and-a-half-inch faces upon 15 × 12 plates. Having a 5D Dallmeyer lens and a camera fifteen inches square, opening to about three feet nine inches, I thought myself fully equipped for the purpose. I was soon undeceived, however, for the lens proved too small, and the camera just a thought too short. I had, however, imbibed the idea, and was not easily daunted. I made up my mind to go in for the smaller set—perhaps even for the larger. "*Ce n'est que le premier pas qui coute*," said Napoleon, who is generally allowed to have shown great skill in taking off life-sized heads by a process very direct indeed. I soon borrowed a 7D from a friend, and my assistant knocked up a box about eighteen inches deep, which we fixed to the front of the camera, thus making the latter more than five feet long. The next thing wanted was a bath. I consulted the catalogues of the dealers, but it was evident that nothing suitable was to be had under a bank note. I had not yet entered into the spirit of the thing, so I hesitated. I remembered, however, to have read in the journals a description of a wooden bath coated with pitch. Just the thing! I got a carpenter to make me a large bath of ash, with a hinged lid, and a bar fixed horizontally near the top. Having cut a suitable hole in the top of the table made with a stand, this bar not only prevented the bath slipping through, but enabled me to rock it very easily. The bath was made up according to the formula of Elbert Anderson. The next thing wanted was a dipper. I have a decided objection to ebonite in any shape. I was told glass dippers were not made of sufficient length; still I bought the longest I could get. It proved too short by several inches, so we made up the difference with string, and pulled it up by a loop. The dipper being slight and brittle soon broke at the bottom. Here was a fix. "Who loves a garden loves a greenhouse too," said Darwin. Happy thought!—a wooden bath should have a wooden dipper. Looking about, I spied an old rosewood T-square that been knocking about for many years. Just the thing; with a little cutting it held the plate capitally. The weight of the plate carried this new-fashioned dipper to the bottom of the bath; but, being very buoyant, we had to lift it carefully, as it had a tendency to jump out.

Only one thing now remained—the camera-stand. All our efforts to use or improve those I had were unavailing; they proved too short and too unsteady. A deal table with a wooden bar to raise the back of the camera answered the purpose very well. All being now ready for the venture, we determined to try one of the 15 × 12 plates. Having fitted a rounded wooden top to the neck of an earthen jar, and stretched a piece of flannel over it, we were enabled to coat the plate balanced on the top, or to develope without any difficulty. Our first plate, however, was one mass of fog, with a most ghostly image dimly discernible in the centre—the mere shadow of a shade! There was evidently something amiss with the bath; but it was difficult to say what that was, as it seemed all right by the usual tests. I consulted my friends. One advised boiling, another the precipitating of the newly-made bath, and a third that it should be let alone till it came right of itself. With two or three days' sunning, however, and the addition of a little nitric acid, I got rid of this trouble. It was nevertheless evident, from the brown colour of the bath, that the silver was gradually dissolving the mixture of tar and pitch with which the interior was coated. I was obliged to filter nearly every day, and was much troubled with pinholes. Eventually I found it expedient to give up both bath and dipper. I procured a large gutta-percha cradle bath, capable of taking a plate 17 × 23, and have found it answer very well. For my next dipper I procured a strip of ground glass one-eighth of an inch thick, three inches broad, and twenty-nine inches long. I got the glazier to cut off two pieces about half-an-inch broad from the end. These two pieces, after being ground so as to retain the plate, were fastened, one at each end, with marine glue. This dipper has done me good service. I submit it for your inspection. As you will see, it is a substantial article, and not to be broken by a trifle. I confidently recommend the plan to any one who requires a dipper of extra size. The cost was sixpence.

Having thus got over the mechanical difficulties I resolved no longer to do the thing by halves, but to try the large size. Here I met with the last and greatest trouble of all; none of my models came up to the required size. I contend that a majority of the large direct heads exhibited were really, however unconsciously on the part of their authors, enlargements upon the natural size of the models, more especially the female faces. In order to show that I am not alone in this opinion, and that they produced upon others this disagreeable feeling of exaggeration, I will give you a few extracts from the critiques upon these heads that appeared in the daily press. I have avoided, as far as possible, all personal allusions:—

Globe, October 24.—"Owing to the fact that prizes have been offered for large-sized heads from nature, the exhibition is full of ambitious effort; it is also full of failure."

Daily News, October 25.—"The efforts of the artists who apply themselves to taking large pictures direct deserve praise; but in the meantime these portraits, when they get to life-size or *beyond* that, are far from satisfactory." Another extract from the same says:—"The heavy masses of black shadow, the ghastliness of the white surfaces (in some cases the complexion that of a corpse), and the general look of hardness and *exaggerated* prominence of feature, show that the indefatigable efforts of artists and amateurs have not yet been followed by success." Further on the critic mildly alludes to the pictures as "these gigantic nightmares."

The *Daily Telegraph, October* 25, says, speaking of Colonel Wortley's heads:—"These and one or two others from the hand of the same distinguished amateur are of *heroic* rather than life-size."

But I will not cull any more of these flowers of rhetoric that so plentifully bestrew the critical garden. I have, I think, quoted enough to show that these large heads conveyed to what I may call the outside world an effect of exaggeration, not merely in the features, but in the sizes of the heads themselves. Do not think because the difference in size is small—merely an inch or so—that therefore it must be of trifling import; the difference between success and the want of it is often owing to the presence or absence of what appears of small importance. It is the *little more* or the *little less* (as the Italians say, "*Il poco pin o il poco meno*") that makes all the difference. One thing was unanimously allowed—that the smaller series of five-and-a-half inch heads was decidedly superior to those competing for the first prize. I think this may be easily accounted for. In the first place, there is no lens that is really equal to the work of taking, without exaggeration, and in such a time as to render the work really practicable, a life-sized head. It is pretty generally acknowledged (if anything in connection with photography can be said to be settled) that the D lenses of Dallmeyer are those best suited to large heads or figures. They have the disadvantage of being exceedingly slow, but have considerable flatness of field, while an attempt, at least, has been made, by diffusion of focus, to overcome that greatest of all objections to the use of large lenses—the want of depth. The disadvantage attending the use of single or landscape lenses being the coarseness of the rendering and loss of half-tint, I used a 7D (that is, a five-inch) lens, with a back focus of twenty-four inches. This is the largest size generally made; in fact, I never heard of anyone who has a larger, except Mr. Crawshay, who uses an 8D. To obtain a head of the size of life I had to bring the front of the lens within five feet of the sitter. This was bad enough, for exaggeration of the more prominent parts follows as a matter of course. The principles of perspective are violated. The human eye can only take in at one time what is contained in an angle of sixty degrees. If I approach so near to an object as to command a greater angle of view, distortion follows exactly in proportion as that law is violated. Dallmeyer, in his pamphlet on lenses, observes:—"What is the proper distance at which to place the subject from the lens?" In answer, it may be safely asserted that it should, as a rule, be not less than twelve feet, nor perhaps more than twenty-four feet; for, if less than this, the resulting picture will probably be defective, both in definition and perspective, because the lens producing it will be of too short a focus. Thus you perceive that, while the maker of the lens cautions me not to go within twelve feet, I am obliged, in order to get a life-sized head, to bring the lens within five feet.

Then came the other trouble I have spoken of. I placed the model (a lady), and went with my strip of cardboard to measure her face, as I have explained in a letter in the *News*: exactly six and a-quarter inches. This, of course, would not do, but by moving the lens about a foot nearer to the figure I got the right size, but everything else was wrong. Fancy, too, the huge Cyclopean eye of the lens staring into a lady's face at less than four feet distance, and you may imagine the elongation of the facial muscles that followed. I next tried my assistant, who is about five feet ten inches in height—a face of seven inches. I tried several others, but they were below the standard. At last I found exactly what I wanted, so far as size was concerned—a face of seven and three-quarter inches. As my friend was wounded at Waterloo, where he was a captain of cavalry some fifty-nine years since, he can scarcely be called a young man, but having sat without flinching for smaller portraits we determined to try the life-size.

You will scarcely be surprised to hear that, after three sittings, varying from three to five minutes (for I had taken out the stops, so as to approach as nearly as possible to the instantaneous), although my sitter had borne the infliction with the patience of a martyr, there were signs of movement in every one. My friend would not acknowledge that he could have moved, and attributed the apparition of a spare nose and sundry additional eyes to the head-rest or the shaking of the floor. I have a skeleton studio in the garden, so our next attempt was made there. The light, however, was not first-class, and I hit the time exactly with a two minutes' exposure, using a number two stop, and removing it during the sitting. But again the double nose appeared. My friend the colonel attributed this untoward event, as the Duke of Wellington styled our victory at Navarino, to the shaking of the table or the rotation of the earth, I forget exactly which; one thing, however, I remember perfectly—it was *not* to his having moved. No doubt the length of the exposure was partly due to the advanced season of the year; for by the time that all things were in order, and I had got through the preliminary stages of my troubles, we had come to the commencement of October. Following the directions of Dallmeyer, when I brought the lens so near to the figure I diffused the focus of the lens by giving nearly four revolutions of the screw. This, of course, takes off considerably from the sharpness of the head, but is necessary in order to get something like evenness in the definition. I think the best effect is obtained by a combination of this diffused focus with the use of a small stop. Of course, this must add very materially to the already very long exposure.

At the risk of being tedious, I have entered into these details respecting the large D lenses, as I do not find their management is generally understood. Mr. Blanchard, who uses a lens of this construction, once observed to me that they require an apprenticeship to use them properly. A letter from Mr. Samuel Fry has lately appeared in one of the journals, stating that by the improved construction of his studio he had been enabled to reduce the time of exposure required by a 7D most materially. As his experience differs very much from mine, I shall, if possible, avail myself of his kind invitation to witness these results. Mr. Fry makes one very valuable suggestion. He proposes that the side light of the studio should be made to slide along, so that the light may be admitted without any obstacle. For some time I have been contemplating such an alteration with regard to the top light. Why should we not apply the principle to both? In the summer season it would not only shorten the sitting, but add materially to the comfort of the sitter.

And now, gentlemen, I approach the end of these troubles. The obstacle with regard to the more than life-size heads prevented me from competing in that class, and I contented myself by sending three of the smaller size on 15 × 12 plates. As I never expected that one who has had so little practical experience of this kind could successfully contend against the giants of our art, I experienced no disappointment at my want of success. I rather console myself with the reflection of the old Greek poet—"In great attempts 'tis glorious ev'n to fail"—and rejoice that the art I love has better followers than myself.

If I may be allowed to sum up the results of these random observations, I must admit that for extreme sizes the enlarging processes are easier, cheaper, and may be used in many cases where the large lens cannot. As far as they will properly go, however, I believe in the direct pictures. They have more force, depth, and brilliancy, more detail, and, I believe, more refinement. If we refer to the acknowledged leaders of our art-science we shall find their success is owing to their larger and bolder work; none of them owe their reputation to any enlarging process. The aspiring photographer will not be contented with a dull mediocrity. He will strive not merely to equal the works of his competitors, but will endeavour by all possible means to extend the bounds of the art he follows. Can such a man be content to stop at *carte* negatives? I boldly answer—No!

R. W. Aldridge.

Our Editorial Table.

Instruction in Photography. By Captain Abney, R.E., F.C.S.
London: Piper and Carter.

This manual may be looked upon as a sort of second edition of that which we reviewed in our number for December 8, 1871; but there is this essential difference between the two—the former was printed for private circulation only, being intended for use in the School of Mining Engineers, Chatham, whereas this is issued *pro bono publico*. The former edition claimed "Lieutenant" Abney as its author; the present issue is by "Captain" Abney. We hope that in the next edition we shall find a decided advance made in the military title attached to and preceding the name of the able author of the work to which we here direct attention.

In this manual several of the dry-plate processes are described fully. In noticing the gum-gallic process we observe that, in speaking of the exposure required, Captain Abney says that "it should rarely be less than four, nor more than twenty, times that required for wet-plates under ordinary circumstances." As this is contrary to what we have described in our series of articles on *Dry Processes* published in our last year's volume an explanation is required. The time of exposure—not less than four times that of wet collodion plates—given by Captain Abney is quite right when using the iron developer recommended by him; but a plate exposed for such a length of time would be lamentably overdone if developed according to the most recent directions given last summer by Mr. R. Manners Gordon, the introducer of the process. At the time we wrote the supplement to the article on *The Gum-Gallic Process* [see our number for June 6, 1873, page 264] Mr. Gordon had entirely discarded iron in favour of pyrogallic acid as a developer, with this advantage—when a strong solution of the latter was used the time of exposure required was reduced to almost that of wet collodion.

In addition to the usual matter which finds a place in every manual of instruction on photography, there is a comprehensive account of Edwards's heliotype process, and also of the photo-mechanical process described by Captain Waterhouse, as well as of the processes of photozincography, lithography, and papyrotype.

Photography in Four Lessons; a Book for Beginners and Advanced Students.
London: J. Solomon. Red Lion Square.

Mr. Solomon's manual is divided into four heads or "lessons"—the first being a lesson on collodion positives, the second on collodion negatives, the third on printing, and the fourth on enlarging. In this manual there is no pretension made to embody either historical or theoretical matter, the aim of the writer being solely to indicate the most approved method of making photographs of the kind described under these four headings. The work is, therefore, intensely practical.

In the fourth lesson—that on enlarging—the subject is divided into various sub-heads, such as the production of an enlarged positive by means of the magnesium light, and the preparation of the sensitive paper requisite for this description of work; the making of an enlarged negative, and of the transparency necessary for its production; together with iodised waxed paper for enlarged negatives of landscape work.

The manual will prove exceedingly useful to old as well as young photographers.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

At a meeting of this Society, held on Tuesday, the 10th inst., the Secretary read the following—

REPORT OF THE COUNCIL.

The Society is again to be congratulated on the continued financial improvement in its affairs, inaugurated some years back. The outlay has been carefully watched with an economical spirit, so that no undue expenditure of the funds should take place; and the consequence is that there is again an increase in the assets of the Society to be reported. This is a point the importance of which cannot be too highly rated; for, as experience very clearly shows, the financial condition of the Society influences in a marked degree the services it renders towards the progress of the art, and the interest which its proceedings awaken among the members, for it cannot be denied that the communications and discussions at the meetings of late years have been more frequent and more fruitful than was the case during the period when the Society was oppressed, as some thought hopelessly, with debt. The annual presentation to members of a picture which worthily represents contemporary photographic art has now been regularly established, thanks to the surplus funds in hand, and Mr. William Bedford's *Old Devonshire Cottage*, which was the print selected last year for distribution, seems to have met the general approbation of members.

As regards the proceedings of the Society, the papers read during the past session include several of considerable importance. At the last anniversary meeting, twelve months ago, it will be remembered that the Secretary of the Royal Society, Professor G. G. Stokes, M.A., D.C.L., gave a discourse *On the Principles of the Chemical Correction of Object-Glasses*, thus inaugurating the year with a most valuable contribution to photographic optics. He pointed out the discoveries since the days of Newton which had contributed to make lenses of all kinds what they are at the present day, and then proceeded to explain the laws which govern opticians in putting together their lenses, and the reasons of the particular combinations adopted; and he especially referred to the difficulties experienced in securing an object-glass with the most efficient chemical rays, as compared to one in which the visual rays is the main point to be considered.

At the March meeting the Secretary called the attention of the Society to a work by M. Victor Fouque in a paper entitled *A Contribution to the Early History of Photography.* He supported his remarks by extracts from the book, which, while it placed beyond a doubt the fact that Nicephore Niepce had been the first to produce permanent pictures from nature in the camera by means of bitumen of Judea, in 1823, also claimed for him the production of camera pictures upon nitrate of silver paper as far back as 1816. From the published letters of Niepce to his brother there would seem no reason for doubting his claim thus to be considered the first photographer. It was further pointed out in the communication that the assistance and information which Niepce gave to Daugerre upon the establishment of a partnership between those early investigators were of a very complete nature, and seemed to point most unmistakably to the fact that some of the main ideas elaborated in the process of daguerreotype emanated from the earliest of photographers, Nicephore Niepce.

A paper on the history of some photographs, uranium prints, &c., was read by Mr. John Spiller at the April meeting. The author called to mind that uranium had from time to time been frequently resorted to by photographers in their work, and the production of ferrocyanide-of-uranium prints, as practised some time ago by Mr. Robert Hunt and M. Niepce de St. Victor, ought not to be lost sight of. The peculiar and pleasant tone of the three pictures was such as to recommend them under certain circumstances; and Mr. Spiller not only explained, but demonstrated, the working of the process before the Society. On the same occasion Captain Abney, R.E., criticised at some length the chemical theory of the latent image, as propounded by Dr. Reynolds. He believed that gentleman to be perfectly correct in his assumption regarding the action of light upon iodide of silver as to two bonds of iodide being liberated by the same, and being thus free to enter into other combinations; but deemed it a moot question whether the image was formed of subiodide of silver by the addition of silver or by the abstraction of iodine. The author rather inclined to the opinion that the subiodide was formed in the latter manner, no image being capable of development on iodide of silver without the presence of an iodine-absorbent.

In May a communication relative to two novel methods of carbon printing by M. A. Marion was read. The two processes were termed *Mariotype by pressure* and *Mariotype by contact.* The author supported his statements by some excellent illustrations of pigment printing produced by the methods he described. *Mariotype by pressure* consisted in exposing a sheet of bichromated gelatine to the action of light under a *cliché*, then transferring it to a bath of weak bichromate solution, and afterwards employing it in a press as a printing-block. Instead of being inked, a solution of bichromate of potash and chrome alum was applied to the surface with a sponge, and then a sheet of carbon tissue pressed down upon its surface. This latter in part absorbed the chrome alum where this liquid had permeated the printing block (viz., in those parts unaltered by light), and after the two surfaces had been in contact for a brief period the tissue was withdrawn, the block again moistened, and the operation repeated. The tissue was then developed, and an image formed by such portions which had been fixed by the chrome alum refusing to wash away. *Mariotype by contact* consisted in sensitising a sheet of gelatined or transfer paper, printing upon the same with a negative, and then pressing a piece of tissue moistened in bichromate solution upon the gelatine image. The development took place some hours afterwards, when the black pigment was found to adhere to the gelatine image. It is much to be regretted that M. Marion, who was a member of this Society, did not live to work out more fully these promising processes, which only represent a small section of the good work he did in aiding the progress of photography; he fell ill within a few weeks of their being made public, and died in the course of the summer. Mr. F. R. Elwell at the same meeting contributed some valuable notes on instantaneous photography, for which he has acquired considerable reputation; he detailed his plan of working, and gave the formula of the developer he employed.

In June Mr. Jabez Hughes read a paper *On Improvements Needed in Photography, and Remarks on Three Wet Processes.* The author pointed out how very little progress had of late years been made with the wet collodion process, for with but one or two exceptions it still was as when Archer published it more than twenty years ago. Mr. Hughes then went on to discuss the merits of three variations of the wet process, viz., the acid-bath system of Mr. Black, the heavy-salted collodion of Mr. Elbert Anderson, and the wet bromide process of Major Russell. Although he had experimented very fully with all three methods, he could not take upon himself to say they would produce ultimate improvements, for it was only after long and patient trial that a trustworthy mode of working could be ensured. He had more hope of improvement resulting from following Mr. Anderson than Mr. Black; and probably when the bromide process had been practised as long as the ordinary bromo-iodised, it would be as thoroughly understood and appreciated. Mr. Hughes concluded by urging photographers to give more attention to original investigation as the best means of ensuring real progress in the practice of photography.

A paper on *Photo-Collotype Printing* was contributed at the same meeting by Captain Waterhouse, who described the uses to which carbolic and nitric acids might be put in the method, and gave other information of practical value. This paper Captain Waterhouse supplemented by another at the December meeting, containing additional notes on the subject.

In December also Lieut. Chermside, R.E., who accompanied Mr. Leigh Smith in his tour in the Arctic seas, gave an account of photographic practice in high latitudes, and narrated several interesting details connected with the manipulations to be performed under very unfavourable circumstances.

In January Dr. Mann exhibited a large series of photographs illustrating the eruption of Vesuvius of April, 1872, which had been collected by Mr. J. M. Black. Dr. Mann called attention to the perfect manner in which the phenomenon had been recorded by photography during the whole period of the eruption, and how graphically the course taken by the lava over the surrounding country had been depicted. A *Note on Sepia Printing*, by Mr. W. H. Watson, was also read.

Notwithstanding the difficulties attendant upon holding the annual exhibition in a different *locale*, and at a somewhat earlier date than had been the custom for some years past, the gathering cannot be considered otherwise than as a perfect success, whether regarded in its artistic, financial, or popular aspect. The number of pictures hung exceeded that of the preceding year, while the ambitious dimensions of a large number of them was a matter of universal comment. These bold cartoons and magnificent enlargements were in great measure due to the encouragement given by Mr. Robert Crawshay, of Cyfarthfa Castle, who has sought to develope a bolder and freer class of work by the offer of a series of handsome money-prizes, thus rendering a service to photographic art which must be unhesitatingly recognised. From a financial point of view the result also was a satisfactory one; for, notwithstanding the heavy rental of the Gallery in Pall Mall, and the many expenses inherent to moving into new premises, the expenditure was not in excess of the money-takings. So promising, indeed, have been the financial statements of the exhibitions for the few past years, it may be confidently anticipated that, instead of being a burden and expense, as in former times, the exhibitions, if well managed, will ultimately become a source of income to the Society. It was found impossible to keep a very accurate return of the numbers of visitors to the exhibition, because many friends were admitted accompanied by members, but it may be of interest to know that as many as 1,113 tickets were used by members of the Society, admitting in all 2,630 visitors. Besides these, no less than 1,604 persons paid for admission, and, therefore, inclusive of members, many of whom paid repeated visits to the gallery, the gross total of visitors could not have fallen short of 5,000. Among the more distinguished who honoured the Society with a visit were their Royal Highnesses the Prince and Princess of Wales, who made a careful examination of the pictures. The success of the exhibition was materially assisted by the many important press notices which appeared in most of the daily and weekly newspapers.

In one branch of photography marked progress may be said to have been made during the past year, viz., in the matter of enlargements. By adopting an improved medium in the preparation of transparent positives, the process of enlarging from the latter has been bettered, as demonstrated by the magnificent productions of Messrs. Spencer, Sawyer, Bird, and Co., Mr. Edwards, and others.

The preparations made for observing the approaching transit of Venus have led many photographers to turn their attention to consider the best means of applying the process for astronomical purposes. Dr. Krone, of Dresden, has made a microscopical study of different films, and pronounces an opinion that a collodion plate treated with albumen as a preservative is the most stable film that can depended upon. His research is, however, confined to an examination of the film itself, and does not treat of the influence of various developers. There seems a marked inclination on the part of photographers to use the dry process on the important occasion, without having recourse to any intensifier whatever. The studies of Rutherfurd, Draper, and Lockyer upon the solar spectrum lead one to infer that photography must necessarily become indispensable in spectrum analysis, for it is only by a combined optical and chemical observation that a true record of results can be secured. Dr. Vogel, of Berlin, has recently confirmed the observations of Sir John Herschel and Mr. Robert Hunt in regard to bromide of silver being sensitive to all rays of the spectrum; and, by employing preservatives differently tinted, he makes the bromide film possess maximum sensitiveness for different kinds of rays, according to the colour of his sensitive film.

Among other foreign contributions to photography may be noted an exhaustive treatise on dry plates by Dr. Schnauss, of Jena, and another by M. de Constant, of Lausanne. M. Leon Vidal's polychromic process, which may be termed rather a mechanical than a photochemical method of producing photographs in colours, has created some attention in France and in this country.

The obituary for the year contains the names of M. A. Marion, to whom allusion has been made, and Mr. E. Bullock, of Leamington.

BALANCE SHEET OF ASSETS AND LIABILITIES ON 31ST DEC., 1873.

1873. Dec. 31. Assets.	£	s.	d.	£	s.	d.
Entrance Fees and Subscriptions due	£145	19	0			
Less 20 per cent. for bad debts	29	4	0			
				116	15	0
Journal: Advertisements outstanding	49	5	6			
Advertisements and Sales acc. (1873)..	15	6	2			
				64	11	8
Cash and Balance at Bankers				171	1	5
				£352	8	1

1873. Dec. 31. Liabilities.	£	s.	d.
General Expenses:—			
Sundry Accounts....(about)	31	18	6
Journal account	15	12	2
Balance in favour of the Society	304	17	5
	£352	8	1

Audited and found to be correct.

(Signed) J. WERGE, W. S. BIRD, } Auditors.

February, 1874.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on Thursday, the 12th instant,—Mr. F. Howard, Vice-President, in the chair.

The minutes of the previous meeting having been read,

Mr. Samuel Fry exhibited a cap for the lens in which was inserted a circular piece of opal glass. The object of this cap, he said, was to assist the action of the light upon the sensitive plate, which was first exposed to the light transmitted by the opal glass, and afterwards to that from the sitter. He found that in that way the exposure to the sitter was much shortened.

Mr. Foxlee stated the results of a number of experiments performed by him in the same direction about eighteen months ago in the presence of Mr. J. T. Taylor, an account of which had been published in The British Journal of Photography at that time. Specimens illustrating the effects thus obtained had also, he said, been exhibited at their technical exhibition in 1872. He disagreed with Mr. Fry that any special advantage was gained by using opal glass over either coloured or weak light, for it was to light alone that the effect was due. The sole advantage of coloured light was that it was more easily controlled, an exposure of twenty seconds to a green light being about equivalent to one second to white light.

Mr. Brooks said that he had found it advantageous to develope a negative at first by an orange light, and afterwards by a pale yellow light, using glasses of those respective shades of colour for the purpose.

After some further remarks, in which the Chairman spoke of methods by which the effect of opal glass might be obtained.

Mr. Aldridge read a paper entitled *My Troubles in taking Large Direct Heads.* [See page 87.]

After a desultory conversation,

Mr. H. Garrett Cocking read a paper entitled *My Experience in Taking Direct Large Heads.* [See page 86.]

Both Mr. Aldridge and Mr. Cocking, Jun., exhibited prints of large heads taken from 15 × 12 negatives.

The Chairman thought that the difficulties encountered by Mr. Aldridge arose mainly from his using a bath which had been coated with pitch and rosin.

The thanks of the meeting were awarded to the gentlemen who had furnished the papers, and it was announced that Mr. Fry would, at the next meeting, read a paper *On Studios.*

The meeting was then adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

This Society met on Thursday, the 12th inst.,—Alfred Brothers, Esq., V.P., F.R.A.S., in the chair.

The minutes of the last meeting were read and confirmed.

The Chairman read the following letter from the Rev. Canon Beechey, M.A., V.P.:—

"My Dear Mr. Adin,—I am delighted to be among you once more in any capacity, even though I now appear as a 'caution.' But only think that, after more than thirty years of oxyhydrogen experience, I have had an explosion (the first I have ever known), which might have been a great deal more calamitous than it was.

"I think it may be interesting to our members, and perhaps even salutary to the public, to know how this happened, inasmuch as it resulted from no carelessness nor any previously-experienced cause, so far as I know.

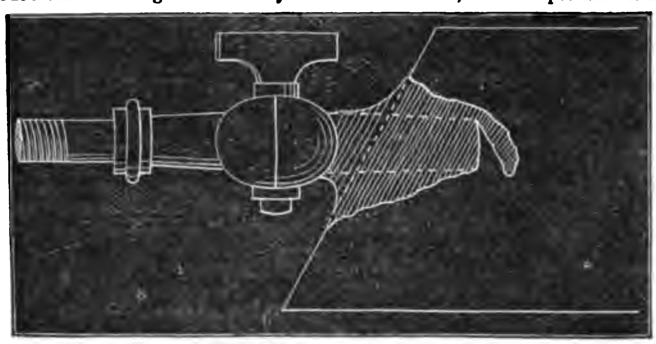
"Just before leaving Worsley for Hilgay I bought a new bag from Messrs. Macintosh, which they made on purpose for me, and a real beauty I thought it. I kept it rigidly for oxygen, and luckily for me it proved that it was not full of hydrogen, or I cannot tell the consequences. As soon as I got here I had a new pair of jets from Knott, of Liverpool, and beauties they also appeared.

"I only gave two lectures last winter, and on both occasions I found a difficulty in getting sufficient oxygen for more than a comparatively small jet of hydrogen. However, the light was sufficient for my school-room, so I did not investigate the cause.

"This winter I was about to lecture more. My first lecture was like the former; but, having no longer a son to manage my lanterns, I was endeavouring to teach my intelligent gardener, and was determined to get a good light, so we rehearsed in my study. First trial—light as usual. 'What is the reason we cannot get oxygen enough?' I took the jet to pieces; it was quite clear. I blew through the tubes; they were perfectly free. I examined the taps, and took out the plugs; there was no impediment anywhere. It could not be in the bag, for the gas went *into* it quite freely. 'Well! let us put on more pressure.' We had only fifty-six pounds on each bag (as it was for my study, and of course for a small picture), so we put one hundred weight on the oxygen. Then I cautiously thought it was not safe to have *unequal pressure*, even though it was only the supply of oxygen which was deficient. So we added another fifty-six pounds to the hydrogen also, and regulated the supply by the taps. To my surprise and annoyance, whilst the flow of hydrogen was greatly increased that of the oxygen appeared even less than before.

"My man was trying to get the light. He had turned on only a very moderate jet of hydrogen to begin with, but could not get oxygen enough to ignite the lime with it. He turned on the oxygen tap quite full. The supply appeared to grow less, and soon ceased entirely! In another moment a loud explosion took place, and my oxygen bag burst into a tremendous flame four feet long and from eight to ten inches wide, which would soon have set my room on fire had I not jumped on to the pressure-board, and so squeezed the bag tight at the point of ignition. Fancy how grandly india-rubber would burn in oxygen gas! No sooner was all out, and all safe (for which, I assure you, I felt very grateful), than I took up my poor new bag. It had burst, and had burned at the thin edge from the tap about a foot along to the right.

"On opening the slit the cause of the explosion was at once apparent. By some unaccountable accident in the manufacture the india-rubber, which appears to be put in large quantity round the inner end of the tap, had been squeezed out from its bandages and literally formed a valve thus, over the aperture within



the bag. You see that this would allow the gas to enter freely, but that it closed as it came out, and the more the pressure the tighter it closed. It was not, therefore, difficult to see exactly what had happened. The pressure *in the tube* was very small—enough to let the oxygen come in, but so that the greater pressure of the hydrogen forced it in also to mingle with it; and no sooner were the two mingled in right proportion than, of course, explosion took place.

"Now this explosion was evidently only throughout the length of the india-rubber pipe. This was of large bore and very strong. It fired, therefore, a tolerable charge right into the bag, blew in the valve, and by its tremendous flame first burst the bag and then ignited it at the opening, allowing the oxygen to escape through the rupture all the time it was burning. Had it been the hydrogen bag, of course all the ten cubic feet therein would have ignited and the explosion would have been much more serious—as it was, it blew off the weights by the expansion, and the flame was really something to look at.

"Moral: whenever you find any impediment to the flow of either gas never go on trying to get a light from them, but turn off your taps at once, disconnect your tubes from the jets, and be sure to get a perfectly free flow of the single gas before you connect again.—Your faithful and loving V.P.,

"*Hilgay Rectory, Downham, Norfolk.*" "St. Vincent Beechey.

Mr. John Brier, Jun., read a paper on *The Production of Enlarged Landscape Negatives* [see page 85], and exhibited several prints and negatives in illustration of his remarks.

Mr. Frankland exhibited a number of cameras and other studio apparatus. He said he had a large experience in taking photographs of babies. Sometimes he found great pleasure in taking them; at other times they were a great nuisance. He sometimes thought mothers had conspired against him, and brought all their babies at once. Babies, however, must be taken—there was no mistake about that. It was best, therefore, to lay one's self out for that class of work; for, if they were well taken, the result was more business from older subjects. The baby shutter was of very great value to him; it enabled him to engage the attention of the child with a toy or other object in one hand, while the other was free to work the shutter. He obtained the idea of the shutter from Mr. Blanchard. He (Mr. Frankland) exhibited two of the shutters—one vertical, the other horizontal; also a camera adapted for taking one, two, or four negatives, and a touching desk with light, shade, and hand magnifier.

Mr. Haywood said the present was one of the most interesting meetings it had been his good fortune to attend. He complimented Mr. Brier on the reading of his first paper before that or any society, and said it did him very considerable credit. He pointed to Mr. Brier as a good example for many members who took no active part at the meetings to copy. He also complimented Mr. Frankland on his most interesting display of apparatus. A written description, with drawings, was much less instructive than an actual inspection of such articles as Mr. Frankland had kindly brought a distance of twenty-seven miles to show to the meeting; and he was quite sure the meeting would fully appreciate the efforts of Messrs. Brier and Frankland.

Mr. NOTON exhibited a new form of lantern for the lime light. He said he had taken a hint from the sciopticon, as the form of the lantern would at once show. The body was made out of an Australian beef can, the front part carrying the lens out of a small ditto, and the chimney out of a preserved milk tin. The lantern, unlike the sciopticon, was, he said, a breech-loader, for the condensers were inserted from the back.

Mr. Noton's lantern had a most compact appearance, and served to show how articles that many persons would consider worthless could be transformed into good-looking and efficient apparatus.

The meeting, which was largely attended, was then adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third popular meeting of the season was held in Queen-street Hall, on the evening of Wednesday, the 11th inst., when Dr. Hunter delivered an interesting lecture on *India: its People, Architecture, and Antiquities*, illustrated by a large collection of lantern pictures. The hall, as usual, was crowded in every part.

Dr. JOHN NICOL, in introducing the lecturer, said that it was a source of gratification to the members of the Society that, although those popular meetings had been carried on for so many years, they had not only not fallen off in interest, but, judging from the large audiences and the increasing demand for tickets, they were rather increasing in popularity. As the subjects of lecture and exhibition were not confined to the beaten tracks of country, but extended to wherever photographs could be obtained, it would be easily understood that the committee had often much difficulty in finding a lecturer acquainted with the subject. They were, however, peculiarly fortunate that evening in having Dr. Hunter, who—from a résidence of over a quarter of a century in India, and from his intimate connection with art, being an artist himself of no mean reputation—was eminently fitted for the duties of lecturer on the subject.

Dr. HUNTER began by giving an interesting description of the social condition of the inhabitants of India and the influences of missionary and educational efforts on those on whom they had been brought to bear, giving special credit to several of the Maharajas, who, he said, were men of very superior attainments, and who could take their place beside the nobility of our own country without any cause for being ashamed. The various styles of architecture were explained and admirably illustrated, and the taste and ability in design were shown to be such as to put the manufacturers of our own country on their mettle if they wished to compete with them in the manufactures in which they excel.

The lecture, which lasted over an hour and a-half, was listened to with marked attention, and the large number of illustrations were much admired. On the motion of Dr. Thompson, the lecturer received a hearty vote of thanks.

Correspondence.

M. COYAL'S PERMANENT FIXING PROCESS WITHOUT HYPOSULPHITE.—M. BOIVIN'S URANIUM PRINTING PROCESS.—CHLORIDE OF URANIUM FOR PRINTING PURPOSES.

MARSEILLES appears to be just now quite a stronghold of progressive photographers. M. Vidal, of that town, has given us a new method of producing photographs in colours; M. Melchion, also of Marseilles, a method of shortening exposures in the camera; M. Jaubert, of that town, a method of developing moist plates with iron; M. Terris has been experimenting with the bromide process; and now M. Coyal, of Marseilles, publishes an improved method of fixing positive prints without the use of hyposulphite of soda.

But why have the photographers of Marseilles become thus celebrated for their useful researches and experiments? The answer, I think, will be found in the fact that they have established a photographic society there, the members of which seem to be working well together. What a pity it seems that every large town in our own country cannot have a similar society constructed on a basis of utility and permanency. Why have so many of our provincial photographic societies collapsed? And why cannot some of them be re-established on a better footing? It is incredible what a large amount of good may be done by a properly-constituted and properly-managed photographic society, in the prosperity of which every individual member takes a direct personal interest from pure motives and a healthy ambition.

The process of M. Coyal for fixing positive proofs, which he assures us can never fade from sulphuration, is as follows:—

He makes an aqueous solution of sulphocyanide of ammonium, strength from fifteen to twenty per cent.—say, eighty grains to the ounce of water—and to this he adds sufficient ammonia to render the solution slightly alkaline. He makes two identical solutions, and, after immersing the print in No. 1 for five minutes, he washes it slightly, and then puts it into No. 2 for two or three minutes; after which it is washed for about an hour, and then hung up to dry.

In order to make sure that the last washing water contains no trace of the sulphocyanide he tests it with a little sulphate of iron, and if this produce no red discolouration it is a proof that the prints have been sufficiently washed. They may then, we are told, be regarded as absolutely permanent. The process is given as one which has been employed with success during several months in a large portrait establishment.

Although the fixing agent is costly, yet the solutions will keep in good order a very long time, provided the silver which they abstract from the prints be removed by putting a piece of zinc into the solution, and filtering it before use.

M. Ernest Boivin publishes the following method of producing prints of a fine blood-red colour by means of nitrate of uranium and ferridcyanide of potassium:—

Make a saturated solution of nitrate of uranium, and dissolve in it, over a water bath, about forty-five grains of gelatine per ounce of the solution. Aid the solution of the gelatine by adding a few drops of glacial acetic acid. Then filter it through a sponge placed in the neck of a funnel, and put it into a flat porcelain dish.

Float a sheet of paper upon it for one or two minutes, and hang it up to dry—in the dark, of course, because it is sensitive to light.

Expose it under a negative in the printing-frame to sunshine for ten or twenty minutes, and then develope the image in the following way:—Wash the print, then lay it upon a sheet of glass, and pour over it a solution of ferridcyanide of potassium (red prussiate of potass), strength about forty-five grains to the ounce. This will develope the image. Wash it in several waters, and then for an instant in water slightly acidified with nitric acid, in order to clear up the whites. Then wash it again, and fix it with a solution of alum, strength fourteen grains to the ounce. After a final washing hang it up to dry.

The process may be varied by employing gelatinised paper, and sensitising it by floating upon a bath of nitrate of uranium, saturated. This paper will keep good a very long time. The colour of the print may be modified by varying the strength of the developer. It may also be toned to a black, blue, green, &c., by using suitable reagents.

A similar process to the above was published many years ago by Mr. C. Burnett, of Edinburgh, in my *Photographic Notes*; but the introduction of gelatine seems likely to be an important improvement, in consequence of the vigour which it imparts. What would silver printing be without albumen or gelatine? I have often thought that many of the printing processes with the cheaper metals might be made practically useful to us if we could but get rid of the mealiness of the prints. The effect is that of a dry powder colour instead of a juicy paint.

Have any of my readers tried the use of chloride of uranium instead of chloride of sodium in the common silver printing process? Ought not this to make a much more sensitive paper, in consequence of the nitrate of uranium formed by double decomposition upon the silver bath? Peligot, who has investigated the uranic salts, speaks of a compound of the oxychloride of uranium with chloride of potassium. Would this be of any use to us for salting papers? The protochloride of uranium seems at present to be a curiosity of the laboratory, and I do not know what its properties may be in reference to albumen. Would it coagulate albumen? Perhaps Dr. Emerson Reynolds can tell us.

Redon, February 13, 1874. THOMAS SUTTON, B.A.

THE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Whatever may be the result of the present movement for reform in our Parent Society I trust that the new Council will set an example by putting themselves at all exhibitions where awards are made, as the French do—*hors concours*. This would at once put an end to the suggestions that have been made of members of the Council having, through jurors composed of a portion of their body, awarded each other medals.

I feel sure that no recipient of such award could, under the circumstances, feel that any *real honour* had been conferred upon him. Let it never again be said that out of ten medals agreed to be awarded at one of our annual exhibitions, six of these were awarded to members of the Council, one not competed for, and the remaining three bestowed on outsiders.

I would also suggest another point—that is, that the journal of the Society should become something more than a mere record of the Society's proceedings, and that the Council and members should unite, and by occasional contributions, make it something more than what it has been.—I am, yours, &c., WALTER WOODBURY.

Greenhithe, February 16, 1874.

SUGGESTED NATIONAL PHOTOGRAPHIC ASSOCIATION.

To the Editors.

Gentlemen,—I should like to sound public feeling with regard to a plan for the extension of the field of operation of the London Photographic Society over the whole country, which has been much discussed amongst the reform party in the Society; partly in furtherance of their intention to make the one organisation available to the country members, who, under the old constitution were intirely ignored—an injustice we hope at once to correct—and partly with the feeling that the provincial societies (of which ours has really been one though located at the metropolis) might co-operate in the interests of photography to general advantage.

We should propose to hold the annual general meetings successively at or near different provincial centres, after the manner of the British Association and the American Convention, and to make a collective effort to advance the commercial and scientific interests of photography, which we could do in this way much more effectually than the present organisation will permit, be it ever so wisely worked.

Will your readers show a hand in the matter, and help us to an expression of public opinion?—I am, yours, &c., W. J. Stillman.

February 14, 1874.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the Editors.

Gentlemen,—In order to bring the existence and claims of the Photographers' Benevolent Association under the notice of photographers in the provinces, and to guard the funds from fraud, the rules provide for the appointment of local secretaries in provincial towns.

I shall be pleased to communicate with any gentlemen who will notify their willingness to undertake this duty. All appointments made will be advertised in The British Journal of Photography.—I am, yours, &c., W. T. Wilkinson, *Secretary.*

14, *South-street, Bromley, Kent,*
February 16, 1874.

THE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—I find myself unable to accept the nomination to serve on the committee for altering the laws of the Photographic Society. I have written to Mr. Jabez Hughes to that effect. I should like, as an independent member of the London Photographic Society, to be allowed to make a few remarks in your columns on the somewhat unfortunate state in which the Society now is.

I much regret, and think that regret is shared by some of the requisitionists themselves, that some attempt was not made to induce the President and Council to withdraw their resignations. I did my best at the meeting to favour such a course, but unfortunately without effect, and I fear that the future of the Society will suffer from the present state of affairs. By the resignation of the President and Council the Society loses the services of those men who are acknowledged to occupy the foremost positions in photography, and I do not see how the places of such men as Mr. Glaisher, Sir C. Wheatstone, Lord Lindsay, Professor Stokes, and Mr. Spiller among scientific men, and of Mr. Francis Bedford, Mr. Valentine Blanchard, Mr. W. England, Mr. H. P. Robinson, Captain Abney, and Mr. Sebastian Davis among practical photographers, are to be filled by men of the same calibre from the remaining members of the Society. We also lose the services of Mr. Baden Pritchard, the excellent Secretary to the Society, and of Mr. G. Wharton Simpson and Dr. Diamond, who have been connected with the Society from its commencement.

Under these circumstances I would venture to suggest that if the services of these gentlemen are withdrawn from the Photographic Society of London the Society will lose much in prestige, and will not in future occupy the same position in the eyes of the photographic world as it has hitherto held.

I fear that under the circumstances none of these members will be induced to return to the Council, which, I think, many of us would feel to be a misfortune, because there are men among them whose absence from the Society's Council will be a serious loss to it, and I therefore suggest a medium course by which photography may yet have the benefit of their services, and a society established on a firmer and yet wider basis than is the case with the present Photographic Society of London.

I believe this to be an excellent time to establish a society which shall be called the "Photographic Society of Great Britain," and I believe that such a society would meet with very general support from the great body of photographers. If it were to hold a biennial meeting in one of the large towns of the country, in the same manner as is done by the British Association, great interest would be lent to its work, and the fact of such being a part of its programme would, I think, obtain for it large numbers of subscribers among country photographers. I should hope, and, indeed, believe, that were such a society now organised a majority of the gentlemen who have resigned their seats on the Council of the London Photographic Society might be induced to give their support to the new one, and we might further hope to have the names of Professor Piazzi Smyth, of Edinburgh, Professor Emerson Reynolds, of Dublin, R. M. Gordon, J. W. Swan, and other eminent men not resident in London, on its Council, and Mr. Stillman and Mr. Jabez Hughes—both valuable members of the council of any society—might also be willing to join, the more so as they are pledged not to join the Council of the London Photographic Society. I venture to hope, too, that Dr. Mann and Mr. Le Neve Foster would also give their co-operation, and the elements for the formation of a society of great weight and influence are thus under our hands. I may also point out that so strong a society could undertake investigations in the various branches of photographic science, could award medals for progress in photography, and would, I believe, be of very great use to the general body of photographers.

Further: I believe that the establishment of such a society would greatly improve the position of photography in general. A society so constituted could watch over its interests with advantage, and it might eventually, and that possibly before very long, obtain a charter, and the right to elect fellows, and to have other privileges such as those held by societies of other denominations. I throw out these suggestions to the public through your columns in the hope that they may be worked into some definite shape.

I feel sure, from conversations I have had with many personal friends, that the establishment of such society would be looked on with great favour, and I think every one will agree with me that, if it is to be established, now is the time and this the opportunity for it to be done. —I am, yours, &c., H. Stuart Wortley.

February 18, 1874

[It is difficult to understand the position of the gallant Colonel in this matter. As an independent member we believe he has been behind no one in desiring reform, and we have received a letter from one of the requisionists thanking Colonel Wortley for his support in helping to effect the changes. At the last moment he seems to have regretted his own course. He must remember that the first overt act was taken by himself in asking the inconvenient questions at the December meeting, which neither Chairman nor Secretary answered. At the January meeting these questions and the remarks thereon were noticed as being omitted in the Society's journal and in the minutes of the Society; hence arose the remarkable scene between Mr. Stillman and the President, so graphically described by Mr. Sawyer in his letter in this Journal. Colonel Wortley's action in proposing a list in opposition to that of the Council at the meeting in January was very remarkable, because he undertook, in addition to supplying an antagonistic list of names, the illegal course of determining who should be the retiring members—selecting Mr. Mayland in particular, in opposition to the Council. We have no doubt the propriety of his action is sufficiently clear to Colonel Wortley's own mind; but he can hardly be surprised when other members express themselves (as they have recently done in our hearing) to the effect that they believe he is blowing hot and cold—playing fast and loose—endeavouring to obtain the advantages of both positions, and trying to escape from the responsibilities of either. Between the two parties the position of Colonel Wortley is somewhat an unhappy one; for, while he will be liable to receive the censure of both parties, he will scarcely receive the thanks of either. On his project of taking advantage of the present disturbance to found a new society we decline at present to pass an opinion; but we have in type a similar scheme proposed by Mr. Sutton, and which would have been inserted last week, were it not that we thought the period inopportune for introducing the project. There are some inaccuracies in Colonel Wortley's letter, which are not, however, of moment. How the various gentlemen will like the free use he has made of their names we cannot say; but we have some doubt as to whether these gentlemen will readily accept the programme which Colonel Wortley has laid down for them. That he has not had their sanction we are convinced; and we think he is precipitate in concluding that, because many of them have retired from the Council of the Society with which they have so long been associated, they have therefore lost interest in the Society itself. We trust the time is not distant when many, if not all, of them will resume the honoured positions they have previously held. After all, the differences are only on points of governmental detail, and we see no reason why the old Society should not become expanded and developed into all that Colonel Wortley desires, if the members be sufficiently in earnest in the matter.—Eds.]

To the Editors.

Gentlemen,—Being specially informed that I have been nominated to serve on a committee (appointed at the last meeting of the London Photographic Society) I am obliged, for obvious reasons, to decline the honour.—I am, yours, &c., W. de W. Abney, *Captain R.E.*

St. Margaret's, Rochester, February 18, 1874.

MEDALS OF PROGRESS.

To the Editors.

Gentlemen,—Is Mr. Sutton really aware of what he wrote in last number when he suggested the giving of a "medal of progress" to two gentlemen who claim to have invented or modified something, the nature of which *they have determinedly withheld from the public?* or to another for suggesting the advantage of using less water in the developer than has hitherto been the general practice?

On what principal would Mr. Sutton award a medal of progress to, say, Mr. Burgess for discovering something of which nothing whatever is known, when no suggestion is made for conferring a similar honour upon such men as Dr. Maddox, Mr. King, Mr Bolton, and Mr. Kennett, who have not only made valuable investigations in the same direction, but have presented the results of their investigations and their suggestions freely to the public?

If there are members of the photographic community who will only part with their knowledge upon a bribe being offered to them, by all means let them remain outside. What is Mr. Sutton's own opinion of that gelatino-bromide process to one person connected with which he suggests the giving of a medal?—I am, yours, &c.,

NOT A CLAQUEUR.

EXCHANGE COLUMN.

I will exchange two oil paintings by Fuller, and sixty parts of THE BRITISH JOURNAL OF PHOTOGRAPHY and *News*, 1873, for a good card lens or camera.—Address, Mr. GREEN, 49, Edbrooke-road, Paddington.

I will exchange a lot of first-class lantern slides for a good group and view lens for plates 8½ × 6½; one by Ross or Dallmeyer preferred. Open to offers. List of slides on application.—Address, R. G. ARNOLD, photographer, Market Drayton.

ANSWERS TO CORRESPONDENTS.

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

W. H. PAGE.—Pin the card upon a board, place the camera opposite to it, focus sharply, and use the wet collodion process.

A. J. CORRIE.—After the present number is issued we shall call and see th camera of which you speak, and will afterwards communicate with you.

A. B. BERKELEY.—We shall forward your letter to Mr. Sutton, who will doubtless suggest a solution of the difficulties encountered in following out his suggestion.

AN OLD MEMBER.—We really must decline to insert your facetious communication in its present anonymous guise. Why not give us permission to append your name?

TYRO (Denbigh).—The Dublin Exhibition was held in 1865. This correspondent thanks Mr. P. Le Neve Foster for his valuable article on photographic copyright.

BRUN.—This correspondent sends two negatives upon which he desires us to offer an opinion. With the exception of the damage they have received they are very fair negatives.

J. B.—The sole object in having so little water is to ensure complete saturation. Definite proportions are not necessary. The wash of hyposulphite of soda should be applied last, and not first.

PHOTOGRAPHS IN RELIEF.—The pictures in relief described in last week's number are on view at Mr. Solomon's, Red Lion Square. A specimen is also on view at our Publishing Office.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—We are requested to acknowledge the receipt of the following sums, viz.:—£5 5s. from Mr. Dallmeyer; £5 5s. from Mr. G. W. Simpson; and £3 7s. 8d. from the Rev. D. T. K. Drummond, per Mr. Simpson.

GEO. PRICE.—If you decide upon using glass of such a pale yellow colour three thicknesses, at least, will be required in order that a sufficient obstacle to the admission of actinic light be presented; but it would be far wiser to obtain ruby-coloured glass, using only one thickness.

P. M'BURNIE.—Avoid the use of varnish of the kind alluded to; it gives a vulgar appearance to the print, and, judging by the specimen we saw, will crack in minute reticulations. A better way to secure a high glaze on the surface of the print is to face it by means of collodion and gelatine.

H. J. F. GEORGE.—The terms of admission at present are—one guinea entrance fee and an annual subscription of the same amount. We can scarcely advise you to join the society in its present unsettled state. We shall send your letter to the new secretary, as soon as that official has been appointed.

AMATEUR.—The cracks in the camera may be stopped in a very effective manner by means of a mixture of beeswax and resin, to which has been added any kind of dark pigment. In this way the camera will act in quite as satisfactory a manner as it did before its long usage in the greenhouse at Calcutta.

G. P.—We recommend you not to add the two feet proposed to the background end of your studio. The form of roof we should prefer is that shown in the plan No. 3. It is a pity that you cannot make the studio a little longer; but, by selecting suitable lenses, you will be able to produce good portraits. In the second edition of Carey Lea's *Manual* there are several pages devoted to the construction of glass houses.

FRANCIS CARTER.—We have seen many stereoscopic pictures in which the effect of motion was obtained by alternately presenting one half and then the other of the binocular picture to the eye. This is done by the oscillation of a card between the eyes and the picture. To take a picture suited for producing this effect—such as a blacksmith apparently engaged in hammering a piece of iron—it is necessary that one of the pair of pictures be taken when the hammer is raised, and the other after it has descended.

J. J.—Transfer collodion is made according to the following formula:—

Methylated alcohol	2 pints.
Ether	1 pint
Gun-cotton	1 ounce.
Castor oil	1 „

From the above you can see what additions to the plain collodion you now possess will be necessary.

FELIX.—1. What you require is a finer and more transparent kind of ink; but it would be well to obtain a lesson from a practical lithographer.—2. The addition of a mirror does not render necessary the use of a longer camera. If the negative is to be enlarged consult the table for enlargements in our ALMANAC, and you will discover the exact length the camera ought to be made in order to suit any lens and any degree of enlarging.—3. The collodion may be redissolved by ether.

WM. CROSS BUCHANAN.—You seem to have very good lenses, judging by the portraits. The landscape is quite sharp in the centre; but, as its definition becomes impaired towards the margin, we infer that you have used it with too large a diaphragm. Write again, describing the focus and form of those lenses you possess, and we shall then be in a better position to offer advice. We may state that wide-angle lenses are necessarily, of all others, the slowest that are made. The figures $\frac{f}{36}$ mean that the aperture in the stop is a thirty-sixth part of the focus of the lens.

A. DOBONY.—This correspondent writes, in connection with the compound of mercuric iodide with argentic chloride, spoken of by Mr. M. Carey Lea in our last, that it has been known in England for some years. "I am not certain," he says, "but I believe some six years ago a paper on this and kindred substances was read before the British Association for the Advancement of Science. About that time I prepared several pieces of cardboard with designs in various colours, all equally sensitive to heat, so that when the cards were brought near a Bunsen burner the colours instantly changed, and were as rapidly restored on being removed from the source of heat. The different tints were prepared by substituting other metallic salts for the argentic nitrate, otherwise proceeding in the way indicated by M. Carey Lea.

THE PHOTOGRAPHIC SOCIETY.—We have received several letters on the subject of the present state of the London Photographic Society, for which we cannot possibly find space. "One of the Requisitionists" suggests that in the construction of the laws one should be introduced giving power to the Council to award gold and silver medals for papers and inventions of value. "A Country Member" writes to the same purport, and suggests, further, that the new Council should act towards country members in a more liberal way, in regard to their being allowed to vote, than the recent and former Councils have done. "Richard B. Owen" sends us a very long letter, the purport of which is an inquiry into the good that has been done by the London Society, and in what respects it has advanced photography during the last ten years. Mr. George Hooper (who, by the way, complains that we did not report a speech he made at the last meeting of the Society), expresses the hope that, now that the requisitionists have obtained that which they desired, all parties and "secret societies" will cease to exist, and members, whether official or non-official, will join together to promote the wellbeing of the Society. He also speaks of a "pretended ballot" at the last meeting, and suggests that the reform movement looks like a commercial speculation. Mr. C. Arnold takes us to task somewhat strongly about occupying so much space in the Journal with matters which possess no interest to the provincial reader; and he inquires if we would devote similar space to recording the internal squabbles of the Liverpool, Manchester, or Edinburgh Photographic Societies.

RECEIVED.—J. Nicol, Ph.D.; E. W. Batho; A. J. W.; J. Thomson (in our next).

FIRE IN A STUDIO.—On Thursday evening, last week, between the six and seven o'clock, the Regent-street studio of the London Stereoscopic Company was destroyed by fire.

"THE RIGHT TO ONE'S FACE."—We copy the following valuable suggestions, by Mr. Adolphe Beau, of Regent-street, from *The Times* of the 18th inst., on the much-vexed copyright question:—"May I be allowed a few words on the controverted question of negatives, as it is now transferred to a ground upon which I am particularly concerned? I am sure no respectable photographer will contradict me when I assert that the rule has always been to keep all private negatives for the sole use of the persons whose likeness they represent, and, moreover, that this rule may be said to have been strictly adhered to. I would propose a very simple plan of solving the difficulty. It would consist in entering the negative at Stationers' Hhall in the name of the sitter, who would pay the charge of such entry—viz., 1s.—and thus secure the copyright of the image. For my own part, I am quite ready to offer this satisfaction to any of my clients who may wish it."

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 24	Liverpool Amateur	Free Library, Wm. Brown-street.
„ 26	Oldham	Hare and Hounds, Yorkshire-st.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 721. Vol. XXI.—FEBRUARY. 27, 1874.

ON THE DECOMPOSITION OF OXALATES BY LIGHT.

In connection with our previous articles upon *Printing with Salts of Iron* we shall consider in the following short article the chemical reaction that takes place when the oxalates act as reducers. The salts are not very familiar to us, and when any chemical substance becomes of special interest to the experimental photographer we are anxious that he should be able to grasp his subject, and that, thus acquainted with all its surroundings (as far as known), his experiments may be at once directed with unerring aim to success. This Journal has always been a medium for investigators, and it should always be the main endeavour of all periodicals devoted to any science to stimulate experimental research.

Oxalic acid, either *per se* or in combination as an oxalate, is easily decomposed, and hence its reducing action upon the silver salts with which it is brought in contact, or upon the metallic base with which it is associated, providing that base has two stages of oxidation. This has been already pointed out in our article upon *Printing with Salts of Iron.* The edifices of some of these salts are so fragile that they decompose with explosive violence. Mercuric oxalate detonates when rubbed, and oxalate of silver frequently explodes when overheated on drying. The platinum, vanadium, and uranium salts are all extremely sensitive to light and heat, whilst we have already described some of the reactions obtained with the iron base.

The actual change that takes place in oxalic acid is, however, not quite so simple as it would appear at first sight. It may proceed in hree stages. A molecule of that acid is composed of two atoms of carbon, two of hydrogen, and four of oxygen; or, put into chemical notation, it is written thus:—

$$C_2 H_2 O_4.$$

If it be treated with dehydrating substances sufficiently powerful to tear away the elements of water we split it up thus:—

— $H_2 O$......Water.
C — O......Carbonic oxide.
C — O_2 ...Carbonic anhydride ("carbonic acid").

Oxalic acid...$C_2 H^2 O_4$.

If the acid be treated with an oxidising agent it is converted into carbonic anhydride:—

$$\underset{\text{Oxalic acid.}}{C_2 H_2 O_4} + \underset{\text{Oxygen.}}{O} = \underset{\text{Two molecules of carbonic anhydride.}}{2 CO_2} + \underset{\text{Water.}}{H_2 O.}$$

But the decomposition which most probably concerns us is that which takes place on heating oxalic acid, either by itself or with sand or glycerine; in fact, it seems to be the normal or natural splitting of oxalic acid, proving it is not presented to some strong oxidising influence, or that the heat does not much exceed 212° Fah. It can be brought about very regularly by heating equal weights of oxalic acid and glycerine. This process results in the production of large quantities of formic acid, the acid being split up into formic and carbonic acid. The glycerine takes no part in the reaction any further than to regulate the temperature necessary to bring about the decomposition:—

$$\underset{\text{Oxalic acid.}}{C_2 H_2 O_4} = \underset{\text{Carbon anhydride}}{CO_2} + \underset{\text{Formic acid.}}{CH_2 O_2.}$$

We thus see that the "half-way house" of decomposition as regards oxalic acid results in the production of formic acid, and it is this decomposition that makes the oxalates so energetic as reducers, and so valuable as adjuncts to photography.

Formic acid is the irritating secretion to which ants and caterpillars owe their defensive power. One of the peculiarities of formic acid is its wonderful reducing action upon the noble metal. It reduces also, in the nascent state, the ferric to ferrous salts. Its action upon the salts of silver is most energetic when submitted to sunlight; in fact, this is the test by which the chemist detects formic acid when analysing organic substances. In such a reaction the acid itself is converted into carbonic anhydride and water, just as when we treat oxalic acid directly with an energetic oxidiser.

We thus see that the reducing action of peroxalate of iron is due to a change having been set up in its molecules by the actinic influence, the change being accompanied by the elimination of formic acid. In our previous articles we have explained that the term "ferrotypo," applied to pictures produced by the reducing action of the oxalate, when fixed by a silver or gold salt, is a misnomer. In such a case the image is silver or gold reduced directly or indirectly by formic acid; in the latter case the oxalic acid having previously reduced the ferric salt. In the case of a picture produced by ferridcyanide of potassium the image is again produced indirectly by the acid having reduced the iron salt wherever the light has acted, because ferridcyanide of potassium produces a kind of Prussian blue with ferrous salts, but not with ferric salts.

In taking a picture these complicated and intermediate changes mean very little, and it would suffice to know that peroxalate of iron, after having been acted upon by light, acts as a reducer; but in devising and perfecting a process they are all-important, and in such changes lie those puzzles that have baffled some of our best photographic manipulators.

The oxalate reaction contains the germs of a valuable and economical process.

COPPER IN THE PRINTING BATH.

A question has frequently been put—Does the presence of copper in the nitrate of silver used for a printing bath exercise any deleterious effect upon the prints produced? We have seen the reply given that, under these circumstances, nitrate of copper does; for in that state it would undoubtedly exist in the nitrate of silver, and would have no influence whatever.

Whether nitrate of silver containing a notable quantity of nitrate of copper would interfere with the results obtained by the present mode of toning prints we are not prepared to say; but we may give the result of a practical experiment made some years ago, in the days of the old hypo. toning, which impressed itself very firmly upon our recollection.

We were at the time living some distance from any source from which pure nitrate of silver could be obtained, and we were in the habit of preparing it ourselves from silver procured from a refiner at some distance. On the occasion in question we had exhausted our supply of nitrate, and had not the opportunity at the moment of sending to our usual source for pure silver. To avoid unnecessary waste of time, therefore, we determined to use silver coin as our source of the metal, and dissolved sundry half-crowns and florins in place of the "fine" silver we had usually employed. There are two or three ways known to chemists by which to separate copper from silver; but we thought that the most expeditious and best mode at the time would be to decompose the nitrate of copper formed upon dissolving the coin in nitric acid by means of heat, and for this purpose proceeded, after evaporation, to fuse the nitrate of silver and copper, intending to apply the heat for a sufficient time to ensure the perfect decomposition of the latter, which would have taken place had the heat been applied sufficiently long, depositing oxide of copper with evolution of nitrous fumes. This we proceeded to do, and continued the fusion, as we thought, long enough to complete the decomposition of the cupreous salt. Upon dissolving the fused mass, and filtering the fluid, we found that the solution still retained a *very slight* blue tint—sufficient to show clearly the presence of copper in solution, but still so slight that we did not think the amount of impurity would have had any influence upon the result when employed to sensitise our albumenised paper. The amount of silver was calculated, and the solution made of the ordinary strength.

The silvering was effected in the usual manner, and the prints for the day duly printed without suspicion of anything wrong. They printed as quickly, and were of as good colour as usual; but upon immersion in the fixing bath—which, be it remembered, was at the time both fixing and toning bath combined—the whole of the half-tints and lighter shades of the pictures were at once obliterated and dissolved, so that the entire day's printing, amounting, as we well remember, to upwards of one hundred and twenty quarter sheets of paper, was "done for," and we had our labour for our pains.

Now, to what had been due this destruction of the prints? Certainly not to the presence of free acid in the silver solution; for by far the greater portion of the copper contained in the silver coin had been separated in the form of oxide, and this could not have taken place while a single particle of free nitric acid existed. The nitrate of copper, then, small as its quantity must have been, was surely the cause of our trouble, and we should be glad of an opportunity of ascertaining whether the more recent mode of printing and toning, previous to fixing in hyposulphite of soda, would present the same features as those exhibited at the time referred to.

PHOTO-OLEOGRAPHY.

A correspondent has forwarded to us from Paris a photograph coloured and finished in a peculiar manner. It has very much the appearance of one of the class of pictures now so commonly seen in the windows of print-shops, and known as "oleographs." These, as many of our readers are aware, are merely chromolithographs, which have been mounted upon canvas or rolled in contact with that material so as to give to the surface a semblance of its being a textile fabric.

From a careful examination of the photograph sent to us, about the finishing of which nothing is known by our correspondent, it appears as if the paper had been rendered semi-transparent by means of wax, balsam, oil, or varnish, and had then been roughly but strongly coloured on the plain side, then attached to canvas, and finally subjected to the action of a rolling-press in order that the fabric of the canvas might be indented in the paper. On subjecting this method to actual trial, we find that we have obtained quite as brilliant effects as the specimen sent to us.

A very good and telling effect may be also obtained by making a strongly-printed proof transparent, and backing it with an underdone and strongly-coloured print from the same negative, attaching the two together and then passing them through the rolling-press in contact with a piece of canvas.

When a photograph is finished in this manner, and then subjected to a few touches of colour on the outside or surface, an excellent effect is obtained. This method of colouring has the advantage of not requiring any extreme delicacy of touch; for, as the picture is interposed between the eye and the pigment, any smudginess or coarseness is so far ameliorated as to be imperceptible.

PATENTED INVENTIONS.

No. VI.—PREPARING AND PRINTING DESIGNS UPON METAL.

The services rendered by photography to engravers are incalculable. It is not too much to say that there is scarcely a portrait now engraved which has not had a photographic origin—a fact to which the numerous illustrated periodicals issued at the present day bear ample testimony.

We have frequently described with the necessary minuteness the best methods of photographing upon boxwood, so as to present to the wood engraver the subject of his operations in all the literal exactness of nature; and we have also repeatedly described the means whereby an engraving upon metal of such a subject could be effected by chemical agency alone, and without the intervention of the skilled labour of the educated engraver.

The special adaptation of photography to engraving to which we are now about to direct attention forms the subject of a patent granted to Mr. Henry Bradley, of Birmingham, whose "invention" is not, strictly speaking, for anything relating to engraving in itself, but only for a definite method employed by him in effecting the photographing of the subject to be engraved.

The invention is described as a quick and ready means for transmitting to a copper plate the view, object, or articles to be engraved on the same, this being effected by "the positive or negative application of photography."

The copper plate upon which the engraving is to be produced receives a very thin deposit of silver by the usual electroplating method in general use, and this coating is oxidised by submerging the plate in a suitable acid. The patentee gives no clue whatever as to the nature or constitution of the acid in which, by immersion, the silver is to be oxidised; but, for the benefit of those who might wish to try the process here described, we shall give the requisite information.

If it be desired that the silver, when oxidised, should be of a brownish-black tint, it may be secured by an application of a very strong solution of chloride of ammonium, or, better, by means of a solution of equal parts of the salt just named and of sulphate of copper in diluted acetic acid or strong vinegar. If a deep black colour be preferred—as we imagine would be the case in the present instance—it may be obtained by the application of a moderately-warm solution of sulphide of potassium or of sodium. If the patentee adopt any other and better method of oxidising the silver than these we shall be glad to be made aware of it.

On the oxidised surface of the plate a coating of "prepared wax" is applied. We are informed that this is an essential feature of the invention, but are left in ignorance of the nature of the prepared wax, and at liberty to indulge in surmise as to whether common yellow wax of a fine quality, etching wax (as engravers' etching ground is sometimes designated), or bleached white wax is meant. The waxed plate next receives a coating of collodion, which is sensitised in a silver bath, and is then exposed in the camera to the object to be engraved—be it person, place, or thing.

We find no mention made of the necessity for developing the image which is impressed by the lens; for we are told that when the plate is taken out of the camera it "undergoes a preparation of albumen and a coat of preservative," after which operation it is ready for the operation of the engraver, who may proceed with his work with the thorough certainty that impressions printed from the finished plate will be faithful in outline and detail, thus saving the time of the skilled artist in working out the design and perspective effect for the engraver's guidance.

"Designs thus produced," says the patentee, "would be reversed by the process of printing"—to avoid which he, when desirable, takes a reversed negative. If the patentee were to carefully try the process he has patented he would find that the image developed upon the copper plate exposed in the camera was really reversed, and that as he engraved that reversed image it would produce a non-reversed image upon the paper destined to receive the print from the engraved plate.

There seems to be a kind of "muddle" somewhere. Possibly the patent agent has not had sufficient acquaintance with photography to have been able to grasp the details of the idea. As it stands we cannot clearly make out what is meant.

When a "reversed negative" is employed, the patentee makes a deviation from the method described and prepares his copper plate as follows:—He coats the copper plate in this case with a sensitive film prepared with wax, as in the positive process, and collodio-chloride of silver. The glass negative is then brought in contact with the so prepared surface with the aid of light, by which means a well-developed and truthful positive is produced. It is then toned and fixed, and ready for the engraver to work on. This or a modified process may be applied to surfaces for engraving of a non-metallic character. What follows we quote literally from the specification:—

"Though somewhat technical in my description I have not thought it necessary to particularise the chemical compounds hereinbefore named in connection with the effectual realisation of my invention, as skilled practitioners in the art of photography will well understand both the compounds and use of the preparations or chemicals named, and which invention simply consists in the application of photography in the manner herein described and set forth to the transmission and fixing on prepared surfaces, as herein named, pictorial, statuary, articles of *virtu*, manufacturers' designs, outdoor views, or other matter, which may be enlarged or reduced, as desired, for subsequent engraving or etching, without the aid of artistic skill in drawing or imparting to such surfaces the object or design to be engraved; and which I claim as of my invention and desire to protect by these my in part recited letters patent."

We have very little to add except this—that the patentee's chances of substantiating the validity of his patent, should it ever be questioned, would have been more secure than it is at present had he described with greater clearness and more fulness the exact process he claims to have invented. As it stands at present the patent, we think, would be faulty on the ground of insufficient information, even if the leading idea had been new, which, for the sake of the patentee, we are sorry to say is not the case, as will be seen from the following condensed extract from a well-known publication at least ten years old:—The metallic plate is first covered on both sides with a varnish impermeable to the action of acids; it is then coated with collodion, sensitised, exposed in the camera or by contact with a transparency, developed, fixed, washed, and dried. It is now covered with a preservative, when it is ready for the draughtsman, and, after being prepared by him with a fine-pointed style, it is submitted to the etching fluid.—The patentee will see from the foregoing that he has been forestalled.

During the past week fogs and mists of great density have been unusually prevalent. Those who happened to be in the city on Friday last, about noon, will not soon forget the phenomenal circumstances. Suddenly a dark mass of dense, black fog swept over the streets, and in an instant all was dark. It appeared to be one of those compact masses of fog that travel over London in a mysterious manner, causing locomotion to be arrested, business to be paralysed, and serious inconvenience to those suffering from pulmonary complaints. Atmospheric conditions of this kind entail serious consequences on photographers, whose day—at the best too short—at this season scarcely suffices to enable the numerous sitters which a fine morning brings into their show-rooms to be attended to; and we are aware of several artists who had, doubtless reluctantly, to dismiss a large number of intending sitters brought to town by a singularly clear, fine morning in the suburbs.

We are informed that an "important patent case" is to be fought out during the present year by our American cousins. A claim has been set up, and it is proposed seriously to contest it, for the right to obtain the silver from the various photographic waste solutions, by throwing down the metal by means of a solution of sulphuret of potassium. Now the very essence of any claim for a patent must be its novelty, and surely a process for separating silver in the form of sulphuret which has been in use practically in this country for, *at least*, twenty years, and which so far from being made a secret, has been spoken and written of and been in daily use by hundreds of operators for so long, can hardly *now* be made the subject of a claim for an exclusive application! In this country we have become so thoroughly sick of photographic patents that any process, however good it may be, which sails under the colour of a patent is pretty sure of being looked upon with a certain amount of suspicion, if not of disgust. Of course there are patents and patents, and some few, and *very* few, which have established themselves by their undoubted novelty of application, or by the beauty and manifest superiority of results, have remained, and probably will remain, unquestioned. But how many are there, as reference to our columns will show, which are mere verbal repetitions, or transparent copies, of processes that have been known for years, and which those who apply to the patent office for their enrolment must feel could never bear the scrutiny of an investigation upon their merits! We apprehend that both American and English law upon the subject of patents is based upon somewhat the same sort of principle, and we cannot conceive that a claim which would be ridiculed here could stand for a single moment the brunt of a fight in America which our courts of law and equity would condemn.

ON THE REPRODUCTION OF NEGATIVES BY MEANS OF A COPYING CAMERA AND MOIST PLATES.

Professional photographic portraitists are sometimes put to much loss and inconvenience in consequence of their too bigoted adherence to a particular process, and their being too much the slaves of routine. In the majority of instances they understand only one negative and one printing process, and are too indolent or too sceptical to strive to learn and apply other methods which might be of infinite use to them in an emergency. If they read the journals which are devoted to our art it is chiefly for the sake of the gossip and the advertisements; and everything new, progressive, or explanatory which they may encounter in these useful periodicals is treated with a smile of incredulity as only fit for amateurs, and not worthy the notice of practical men who have their living to get by photography. This is not an overdrawn picture; it is so unfortunately true that some of the most intellectual and persevering of our experimentalists have given up writing to the journals, from the painful consciousness that their communications have no real interest for the majority of readers.

It has often occurred to me as a remedy for this evil—namely, the general want of a comprehensive knowledge of their profession on the part of photographic portraitists—that a good school, or college, where photography could be taught in all its branches by competent masters, and where a diploma of proficiency might be obtained by pupils who had passed a satisfactory theoretical and practical examination, would be an excellent institution, and would tend more than anything else to raise the *status* of our art and its professors, and help along the cause of improvement in processes and appliances. Whether such a school or college might with advantage be connected with the operations of a leading photographic society is also worthy of consideration; but that it would pay in a commercial sense I think hardly admits of a doubt. Why should not a man who elects to become a professional photographer take his regular course of lessons at a photographic college, pass his examination, and receive his diploma, and then set up in business, just as if he had been educated for any other profession?

But these remarks are somewhat foreign to the more immediate subject of this article, viz., the reproduction of negatives, and I have been led into making them because I am anxious to point out to some of my professional readers that the common wet collodion process is neither suitable for *all* the purposes to which they are in the habit of applying it, nor does it really yield the best possible results. Its special use at present is for taking negative portraits; but when the professional photographer is called upon to do other kinds of work—such as copying a tombstone, taking a view in the locality where he resides, printing a glass transparency or a magic-lantern slide, copying a picture or print, or reproducing a negative from which a large number of impressions are required—a modification of the common wet process which I will describe presently may with great advantage be substituted for it; at the same time that this modification not only brings with it some great practical conveniences, but actually yields a better technical result in point of colour, harmony, gradation, and definition. I will endeavour to prove, in fact, that for *all* purposes of negative taking, except portraiture in the studio, this modification of the common wet process is that which a professional photographer ought in general to employ, and that he will show much practical wisdom in mastering its very simple details.

The modification which I strongly recommend is this:—To use bromo-iodised collodion containing not less than three grains of cadmium-bromide per ounce; to excite the film in the ordinary nitrate bath for the usual time; then to wash off all the free nitrate and apply an albumen preservative; to expose the plate either at once or in the course of the day; and to develope the image with pyrogallo-nitrate of silver. If the plate is to be exposed at once the preservative may consist simply of diluted albumen; but, if it is to be carried to a distance and exposed during the day, some glycerine should be added to the preservative in quantity about equal to the albumen.

These plates can be very quickly prepared; they involve no new operation with which photographers in general are unfamiliar; they are slow, but, on the other hand, they allow of great latitude in the time of exposure; any amount of intensity can easily be got, whilst the lights remain as clear as crystal; the negatives are of a yellowish-brown, non-actinic colour, very superior to the grey, dense black of a common iron-developed negative, and the silver deposit resembles a stain in the film rather than a mass of material in relief; lastly, the general quality of the negative cannot be surpassed, or, indeed, equalled, by any other known method.

To prove this latter assertion the reader may try the following simple experiment:—Prepare a plate by the common method, expose it to a uniform patch of blue sky, and develope it with iron. Then prepare a plate by the method which I recommend, and expose it to the same sky, and develope with pyro. and silver.

Now compare the two results. The washed albumen-preserved film will be clean and even, and will show in the most beautiful manner that gradual gradation of shade from the centre to the margin which results from the gradual diminution of light proceeding from the inequality of illumination of the lens. On the other hand, what the common wet plate will show, at the best, will be the unavoidable effect of the iron developer when poured upon a film charged with free nitrate, which it pushes before it, and with which it does not properly mix until the development is nearly half completed. The irregularities thus produced are unavoidable, and inherent in the process; but they pass unobserved until the experiments are made which I have just described. It will then be evident that a perfect negative can never be obtained except upon a washed film, and by means of a developer which is thoroughly mixed in the measure before it is applied. The common wet process is a rapid and elegant means of taking a negative, *but it does not yield the best possible results.* A washed film, exposed either wet or moist, beats it hollow, and has none of its coquettishness and none of its inconvenient drawbacks. The colour, also, is much better both for transparencies and magic lantern slides, and far more vigorous and intense.

It will be seen at a glance that the process which I describe offers immense advantages over *dry* plates for the purposes to which I allude. Any good pyroxyline will do; it need not be particularly powdery. No preliminary coating is required, and no red pigment, because the films do not lose their opacity, neither do they wrinkle or blister in the slightest degree, nor do any of those markings occur which arise from irregularity in drying. One escapes most delightfully from all the troubles which beset the dry processes by exposing the plates whilst still wet or moist. In the latter state I believe they will keep a month, and they are only distinguishable from dry plates by the opacity of the film and its very slight degree of tackiness. As for dust-specks—as these come chiefly in the drying box, where they get firmly imbedded in the film—a moist plate is comparatively free from them, and the negatives which I have taken in this way are the clearest from specks of any in my possession.

And now for the application of this beautiful process to the reproduction of negatives:—

The advice which I have to offer on this most important subject is not suggestive, but thoroughly practical, and the result of a great number of experiments made last year with the view of solving this particular problem; for I have too often found to my infinite regret that good negatives get damaged in the printing, and I resolved that this should not occur again. I therefore had a copying camera made expressly for copying all my negatives full size, and requiring no focussing. The negative is placed at one extreme end, and the dark slide containing the moist albumen plate at the other end, whilst midway between the two is placed a Ross doublet with a small stop. The apparatus is pointed to the sky at an angle of 45°, and the plates are exposed and developed as soon as prepared. A positive transparency is first taken; and this serves for the reproduction of as many negatives as you choose, one after the other. The original negative and transparency are then put away in a box, unvarnished, and secure from all injury in printing. The others are varnished and used in the printing-frame in the ordinary way. To take twenty or thirty of them in one day would be quite an easy task; and if one should get scratched, or broken, or damaged in any way, there would be no great harm done. When the manipulation is well conducted they are not in the slightest degree inferior to the original negative; they may even be better than it, from having either more or less contrast, as may be desired. It is immaterial whether the original negative be thin or dense, but it should be very sharp and full of detail. A thin negative should be copied by a short exposure and a long development, and a dense negative conversely.

The doublet used for copying should be of the symmetrical form, having its front and back lenses equal, and the stop midway between them. A doublet in which the back and front lenses are unequal will give appreciable distortion, owing to the failure of Rothwell's theorem, which is only approximately true. No optician with any sound knowledge of mathematics will, I think, venture to dispute this fact. The practical proof of what I say can be easily tested by applying the reproduced negative against the original one, and looking through both. Although the marginal lines may coincide, and the negatives be exactly the same size, yet the inner lines will *not* coincide also.

A great advantage of copying upon a moist plate is that the exposure may be prolonged to any extent without the film getting dry, so that the copying lens may be used with its smallest stop, even if that be no bigger than a pin's head.

Those who have once fairly tried this mode of reproducing negatives will never, I think, go back to the common wet process, or to dry plates and contact printing, or to collodio-chloride plates, or to carbon transparencies. They will at once perceive that the best results, with the least risk to the original negative, are to be got in the way which I describe. No valuable negative ought ever to be employed itself for printing large numbers of paper proofs. It must infallibly be injured in the process. THOMAS SUTTON, B.A.

"PATCHWORK."

HAVE you room for a little patchwork? There are a few practical subjects upon which I want to say a word.

The first has been brought to my mind by your article in the ALMANAC upon cameras. A portrait camera—especially for card portraits—should be so constructed that, immediately the figure is arranged and focussed, the exposure should take place with the least possible delay. In order that this may be accomplished the plate should be ready to come into position *by one movement* after focussing.

None of the cameras represented in the article fulfils these conditions. In order to do so the plate-carrier and ground glass should all be in one piece. The plate should be 5 × 8 to repeat twice, taking three pictures. It should draw from left to right, with the wooden cell extended enough to protect the plate from light. The exposure should take place by an internal valve closing up against the lens, made with the lower part thicker than the top to ensure its remaining in position when closed, and to be moved by a milled head outside. Thus, as soon as the focus is obtained, the left hand moves the plate in position, while the right is placed on the milled head; thus the exposure may take place in *two seconds* after the focus is taken. The plate, too, is the most practical size for development. I have explained all this before, but principles require to be often repeated to ensure adoption.

The communications in last week's Journal upon the old and often-discussed question of large direct heads will bear a little criticism. I will not enter into any particulars, but only state a principle which, if observed by the gentlemen who labour in the field, must have been seen by them very dimly. The question is not one merely of long or short sitting—not one of good or bad expression—not one of diffusion of focus relatively—not one of brilliancy or of texture, nor of any of those qualities which make up a picture merely as a picture unrelated to any specific original. The question is simply one of *form* or resemblance—a question of relative shape. Can a portrait be taken with a lens above three or four inches diameter—the size of the head being anything above three inches, that portrait being *practically* like the original—except as a caricature? I say, No—for the reason given by Brewster in his work on *The Stereoscope*, page 139. As many may not have the book at hand I will quote one of his sentences. After showing that with a large lens a number of portraits may be taken of the same figure, all from different points of sight, without moving *either relatively*, he says:—"The photographic picture is a combination of about one hundred and thirty dissimilar pictures of the sitter, the similar parts of which are not coincident." He shows further that, "in the language of perspective, the picture is a combination of one hundred and thirty pictures of the sitter taken from so many points of sight."

One writer observes that "the want of depth is the greatest of all objections due to the use of large lenses." It is clear he completely overlooks, or does not understand, the true objection. If he had a lens with penetration enough to focus all parts of the head well, such lens would avail nothing towards making a likeness of the head as seen by ordinary vision, if the lens were so large in diameter and so near as to view the head from points so wide, so as to combine them all in one swollen image of the head. The criticisms of the press is evidence that such is acknowledged to be a fact. The art of enlarging, in my opinion, cannot be too carefully studied; there lies one line of true progress.

Mr. Baker, of Clifton, sent for me to be present while he carefully tested the method suggested by Mr. S. Fry to shorten the exposure. Mr. Baker—who is one of the cleanest and neatest manipulators I have ever seen—had formed a suitable cap for the lens, and the first experiment was on a repeating plate for two. The first picture of the two, on a dull day, had twenty-five seconds; the second was first exposed through *the cap* four seconds, and without it twelve seconds, and it was the better lighted of the two. Further experiments bore out Mr. Fry's statement.

Lastly: I am certain the profession owes much to Mr. Fry, for bringing the question of studio lighting up again, and so freely giving them the result of his matured and large experience. Notwithstanding all that has been written upon and done in connection with the question of lighting, from some cause or another at least fifteen out of twenty portrait photographers do not understand anything about it in the true sense. I enter many studios where the grossest ignorance is clearly exhibited as to the right method of lighting. From this cause, and from it alone, result the numerous flat, cold, grey pictures so frequently to be seen. Next to their arrangement, the virtue found in pictures produced by the best men is due entirely to intelligent lighting. JOHN BEATTIE.

NOTES FROM THE NORTH.

How often has the question of the production of the latent image been discussed? and are we any nearer a final decision than ever? "W. J. C. M." (what can people want with so many names?) in a contemporary once more revives the subject, with a strong leaning towards the electrical theory, and perhaps, after all, there may be more in it than most people are disposed to think there is; at all events, the members of the Edinburgh Philosophical Institution had recently an opportunity of seeing some striking proofs of the intimate relation existing between light and electricity, in its action on the eye, in the course of a lecture delivered by Professor Dewar.

Professor Dewar and Dr. McKendrich have for some time been engaged in investigating the question of the action of light on the retina, and the consequent production of vision; and the lecture was, to a certain extent, the result of that investigation, so far, at least, as it could be put into a popular form. In the course of their researches they found that when a beam of light was allowed to fall upon a living eye it either became partly converted into electricity or set up an electrical action, which, with the ingenious arrangement of apparatus they devised, could not only be shown to a large audience, but the amount of action estimated with tolerable accuracy.

This beautiful experiment was publicly introduced for the first time by Professor Dewar in his recent lecture, to the astonishment and delight of a large assembly. The eyes of cold-blooded animals live longer after removal from the head than those of warm-blooded animals, and so the eye of a frog was used in the experiment. It was placed in a dark box having a square hole in the side, covered by a movable shutter. Close to the wall behind the lecturer, and about six feet above the level of the lecture table, there was placed a very sensitive reflecting galvanometer. Rising from the front of the table were two posts, supporting, in a level with the mirror of the galvanometer, a four-inch band of transparent screen. The mirror of the galvanometer was illuminated by a beam of oxyhydrogen light, which was reflected in the form of a round disc on the screen. The wires from the galvanometer enter the black box, and are brought into contact with the eye resting on a piece of clay, the eye thus completing the circuit. From this arrangement it will be evident that on the development of electrical action in any portion of the circuit the mirror-carrying magnet will move, and the amount of motion will be proportionate to the strength of the current; and, although the mirror may move through only an exceedingly small space, the motion of the disc of light reflected on the screen will be readily visible, as it is magnified in proportion to the distance between the screen and mirror.

After explaining the nature of the arrangement, Professor Dewar placed the light from a gas jet at a distance of about two feet from the opening in the box, and on his withdrawing the sliding shutter the disc of light on the screen immediately began to move steadily from his left to right, until the maximum of deflection had been attained. The eye then apparently becoming fatigued, the disc slowly moved back to nearly its original position, and, as if the eye had become rested or refreshed, the action again commenced, the disc moving across the screen as before. The experiment was repeated with the light from various coloured flames, with similar results, only varying slightly in degree. Finally: in proof that the action was due to light, and not to heat, when the nearly non-luminous, but hot, flame of the Bunsen burner was substituted for the luminous flame no trace of electrical action was seen.

Of course, although this proves the production of electricity by the impinging of light on the living eye, it does not prove that a similar result takes place in the sensitive film. I hope it will, however, stimulate those who have time and ability for original research to investigate the subject fully, and I have no doubt that photography will gain largely by the inquiry.

While on the subject of light it may not be out of place to say a few words about the wonderful part it played in our recent rejoicings on the occasion of the marriage of the Duke—*our* Duke—of Edinburgh. The illumination, although not quite on such an extensive scale as that on the occasion of the marriage of the Prince of Wales, was yet such as few cities in Europe could have been made to equal. Those who know Edinburgh are aware how admirably adapted it is for such a display; and all who witnessed the result must admit that the facilities were fully taken advantage of. Some idea of the extent of the illumination may be formed from the fact that the Castle, the rock on which it stands, and the gardens at its base, were lighted and outlined by four thousand eight hundred and eighty-one padella. The lofty buildings of the old town, looking north towards Prince's-street, and the windows of Castle-terrace, exhibited six thousand one hundred and fifty-two *ozokerit* candles. St. George's Church and Melville's monument showed one thousand eight hundred large ship lamps, and three thousand four hundred lamps of a smaller size were displayed on several other conspicuous buildings; while public and private gas designs consumed about four hundred thousand cubic feet of gas. Lastly: by way of variety, some three hundred rockets were set off on the Castle esplanade, and about fifty pounds of coloured fires burnt in various parts of the city.

As a matter of course, there is hardly anything great that can occur in which photography has not some part to play, and our illumination was no exception to the rule. The effective method of window illumination by transparencies was largely adopted. Coloured photographic enlargements were extensively used, and were, on the whole, fairly successful. As much, however, can hardly be said in one case in which the lantern was brought into play for the purpose of exhibiting a series of pictures. With such an enormous concourse of people it was necessary that "move on" should be the order of the night; and this was really well managed under the able direction of the police, assisted by mounted dragoons, who kept a distinct line of demarcation between the east and west-going currents. The lantern exhibition, however, with its ever-varying attractions, occurring in the most crowded part of Prince's-street, so tended to cause the crowd to linger that it soon came to a dead lock, in which the screams of women and children, and the cries of strong men, sent terror into the hearts of all who were unfortunate enough to be in its midst; and, as from the pressure on the outside it kept swaying to and fro, it seemed impossible to prevent the weaker going to the wall, or, rather, to the ground, and being trampled to death. Our excellent superintendent of police, however, showed himself equal to the occasion, and, as soon as the stoppage and its cause were reported at head-quarters, the fiat went forth, "Shut up the show," and——it was shut up. In a few minutes the dense mass of people resumed their steady, comfortable progression.

I have said that hardly anything can occur in which photography has not some part to play, and I may add that there is hardly anything great which somebody does not try to photograph. Messrs. Ross and Pringle exhibit two very interesting photographs—one of St. George's Church and one of the Melville monument, illuminated. Everybody exclaims—"How beautiful!" and nearly everybody inquires—"How has it been done?" That it has been done there can be no doubt, for there they are in all their beauty of outline and detail—slightly under-exposed it is true, but only sufficiently so to show more clearly the eighteen hundred lamps blazing away in all the beauty of curve and straight line in which they were so admirably arranged. To the initiated, of course, there is no secret in the matter. The pictures were taken about half-past four o'clock, after the lamps were lighted, and while there was still sufficient daylight to get an impression on the plate. The effect, however, is exceedingly good, and, when the lamps are perforated, and the prints shown with dioramic arrangements, first illuminated in the front and then from behind, they will be strikingly beautiful. Mr. W. Neilson has also had his camera at work, and made a very fair picture of the chaste illumination of the Royal Institution—valuable as a *souvenir* of one of the most effective illuminations in the city.

We have been reading with more amusement than interest the large quantity of matter connected with the Photographic Society of London which has appeared in the journals during the past few weeks, and certainly have a difficulty in knowing what it all means, feeling inclined to agree with somebody who characterised it as "a storm in a teapot." I suppose it would hardly do to recommend both parties to take a hint or two from the management of our healthy Edinburgh Photographic Society; but, nevertheless, I think they might do worse. During the thirteen years of our existence as a Society we have never had a jar, dispute, or misunderstanding of any kind. We have a code of laws of which at least two editions have been printed; yet I venture to say that there are not six of the three hundred members who know anything about them, and that the government of the Society is carried on more according to tradition of what has been found best than in accordance with what the code of laws may contain. We have a president, two vice-presidents, two secretaries, a treasurer, an auditor, and a council consisting of twelve members. The president, treasurer, auditor, and secretaries are elected annually, and may be re-elected as often as the Society pleases. Of course when we get a good president we keep him as long as we can. We have never had a bad or doubtful one yet; but, if we had, of course we should let him go at the end of his first year, and serve the other office-bearers in the same way. The vice-presidents are elected for two years, so that one, the senior, goes out each year, and he is not eligible for re-election until he has been one year out of office; but we secure his services by putting him on the council. The members of the council are elected for three years, so that there are four who retire annually, and cannot be again appointed, unless to an office, till they have had a year's repose. The four who retire are always those at the top of the list. Nothing, I think, can be worse than to allow the Council to say who shall and who shall not retire, as was the case in the London Photographic Society. I may add that the Council always print in the notice by which the annual general meeting is called the names of those they recommend for election as office-bearers and council; and I think it very desirable that they should do so, as they really know best who are the most likely men to aid in carrying on the business of the Society. Of course it is open to any member to propose others; but that privilege has never in any one case been taken advantage of.

I see that our "Peripatetic" friend has somewhat misunderstood the allusion to the "sabbath work" in my paper on *The Progressive Results of the Session;* but as "Scotticus," in a recent number, has put him right, I need not say anything about it. I may say, however, that I learn, on undoubted authority, that the principal partner in one of the largest establishments in London, when asked to go and photograph the Shah on the Sunday, replied that he would not do so for all the jewels his majesty possessed. JOHN NICOL, Ph.D.

GELATINE EMULSION AND GELATINE AS A RESTRAINER.

FROM the numerous applications I have already received for my sensitised pellicle from all parts of the country, I presume there is an earnest desire to at once settle the question whether the gelatino-bromised emulsion is, or is not, to be one of the processes of the future; and from the very flattering manner you have spoken of my first attempts with this process I do not know if I should be right in calling it a new medium or not. At any rate I think I am safe in saying it is new to the great bulk of photographers.

However that may be, I have within the last eight months coated, exposed, and developed several hundreds of plates. Some were prepared with a special object in view, such as rapidity, some for colour, some for density, with and without an intensifier, &c., &c. I am pleased in saying that, with very few exceptions, I have succeeded even beyond my expectations—not that I take any great credit to myself, for I believe the material on which I had to manipulate is capable of much more than at the present time any of us dream of; and I hope before the present season is past we shall have others taking the matter up in earnest and developing its capabilities. In the meanwhile, if you think it would be at all interesting to your readers, I shall be most happy if you will only point out the way in which I can be of any service to them in the matter of the gelatino-bromide.

With respect to Mr. Sutton's comments on this particular process, and his query concerning blisters and the film softening and washing off, all I can say is, if Mr. Sutton had tried for himself (which he admits he has not) he would have left those remarks unwritten. With all the plates I have worked I never had any blisters except when I have tried for them, and you may rest assured that has not been often. With regard to the softening of the film and the amount of washing they will bear, I have had plates in water, after exposure and before development, for several hours, and not one whit the worse for this long immersion. I should be only too glad if I could find some convenient means of softening the film before development. Some of your readers will, perhaps, suggest the putting of them into warm water; that certainly does soften them, but I find it is not a convenient plan.

I should like to say a word or two on gelatine as a restrainer. I find that Colonel Stuart Wortley thinks gelatine a powerful restrainer. My notion of it has always been that it is simply a *retarder* of development. You will probably ask—What difference is there between restraining and retarding? In one sense none, but from a photographic point of view a very great deal; and it is from this point I look at it. As a restrainer I think it should act chemically—as a retarder mechanically, which latter I hold it does, and that only. And now for the proofs:—

With the gelatino-iron developer we get hard negatives. Why? simply, I think, from this cause:—The gelatine being mixed with the developer prevented its action on the least illuminated parts of the picture; hence, unless the exposure had been a long one, nothing but a hard negative could be obtained.

Again, with regard to the gelatino-bromide film: surely with it we ought not to require any bromide if gelatine be such a very powerful restrainer. But how stands the fact? Why, it not only requires the bromide, but a pretty good dose of it. These, the bromide films, will give a very good idea of the mechanical difficulty there is placed in the way of the developer acting on the bromide of silver locked up, as it were, in the gelatine; for, unless the film be very thin, the image is found entirely on the surface, and such being the fact the thinner we coat the plates (in reason) the better. All the bromide not forming the image is so much wasted; and not only so, but we also have a thicker film of gelatine to deal with, and, as there is always a milkiness or opacity about it, the thinner we can keep it the better, more especially for transparencies. For negatives it is not of so much consequence; in fact, I think it rather an advantage, as we get a softer picture than when we get clear glass in any part of the negative.

I am sorry to have to question Colonel Wortley's dictum on the subject of gelatine as a restrainer, for I hold his views generally in the highest respect, and shall only be too pleased if he can show me where I am in error. I had hoped some one more capable of going thoroughly into the chemical part of the argument would have taken the matter up. I merely speak from practical observation. R. KENNETT.

Contemporary Press.

THE PHOTOGRAPHIC SOCIETY.

[NATURE.]

ALTHOUGH we published last week a letter from Mr. Baden Pritchard, Hon. Sec. of the Photographic Society, impugning the justice or accuracy of our strictures on that Society, our esteemed correspondent has not caused us to change our opinion.

We have now before us the Journal of the Society for the past year (a summer vacation of three months excepted), and certainly it furnishes *primâ facie* evidence of the most apathetic and inefficient condition which is consistent with continuous existence. The numbers contain eight pages each, the page little more than half the size of that of *Nature*, and in the whole year's proceedings there are twelve pages devoted to science, half of this being a lecture by Professor Stokes; three or four papers of considerable value on technical points of photographic interest; and much which the charity of any semi-learned society would be largely strained in giving paper and ink to.

There is no mention of scientific or other committees, no provision for them in the laws, no reports of investigations made or to be made, no notice of scientific discovery abroad or recognition of discovery at home. Mr. Pritchard has no need to assure us that the body "does not profess to be a purely scientific one"—the scientific element in it, so far as its own record shows, is purely fortuitous.

But, without demanding scientific labours from a body not "purely scientific," we do not even find evidence of common activity in the research of practical problems, and if any of its members are, as Mr. Pritchard suggests, engaged in researches on the process and nature of film best suited for transit of Venus observations, they have not had faith enough in the countenance of their Society to place their labours before it, or ask its assistance in performing them.

Since our article appeared the revolution alluded to has taken place, and that part of the Society in favour of reform, having a majority at the meeting appointed for the discussion of the question, have carried an amendment to the laws providing that henceforward the Society at large shall select its Council, and that the majority of the actual Council shall not have the power to select for retirement such members as it sees fit and to decide who shall replace them, as has actually been the case hitherto; it has also been decided that the presidency shall rotate. These measures were, as we learn from the photographic papers, strongly opposed by the Council, and upon being carried by a majority of thirty to twenty-three (the Council itself voting in the minority) the entire body resigned.

As the meeting at which this stroke of singular policy was made was that for the election of the new members of Council, these were enabled to assume the reins of government and prevent the otherwise inevitable total dissolution of the Society. And now that the reformers have its affairs in their own hands it is to be hoped that it will begin a new life of efficiency, and, remembering that it owes the cause of its existence to the labours of scientific men, give its most efficient aid to those scientific researches in which it has become an important element of investigation, as well as to those of a more technical nature which have given photography so great a commercial and industrial value. And, on the other hand, we bespeak for it the aid and countenance of all scientific men whose researches are in any way dependent on photography, and give it, in its reformation, our best wishes for that complete success and efficiency which will make it as useful to science as honourable to itself and its members.

We append the communication to our contemporary, from the Hon. Sec. of the London Photographic Society, referred to above:—

"The sweeping condemnation of the Photographic Society conveyed in an article in *Nature*, vol. ix., p. 263, can only have been written under a want of knowledge or misrepresentation of facts. I will not say one word about any dissension which may exist in the Society; but as the statements you have published are calculated to injure the Society very materially, I will ask you, in common justice, to make public the transactions of the Society for the past year, so that the readers of *Nature* may judge for themselves whether in a body which does not profess to be a purely scientific one science is altogether ignored, whether 'no man of eminent scientific capacity takes part,' and whether the Society is altogether beneath contempt as at present conducted. This I ask you to do not only in justice to the Society, but to the gentlemen whose names are mentioned below.

"1873. January Meeting.—*The Photographic Operations at the Royal Observatory in Connection with Magnetical and other Records*, by James Glaisher, F.R.S.; *Instantaneous Microphotography*, by E. J. Gayer, M.D.

"February.—*On the Principles of the Chemical Correction of Object-Glasses*, by Professor G. G. Stokes, D.C.L., Sec. R.S.

"March.—*A Contribution to the Early History of Photography*, by H. Baden Pritchard, F.C.S.

"April.—*Uranium Printing*, by John Spiller, F.C.S.; *The Chemical Theory of the Latent Image*, by Captain Abney, R.E., F.C.S., F.R.A.S.

"May.—*Improvements in Carbon Printing*, by Monsieur A. Marion.

"June.—*Remarks on Three Wet Processes*, by Jabez Hughes; *Photocollotype Printing*, by Captain Waterhouse, B.S.C.

"December.—*Photography in the Arctic Regions*, by Lieutenant Chermside, R.E.

"So far as investigations are concerned I can mention two, at least, now being undertaken by members of the Society, touching the process and nature of film best suited for the transit of Venus observations.

"BADEN PRITCHARD, *Hon. Sec.*

"9, *Conduit-street, W., February* 7."

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF FRANCE.

At a meeting of this Society, held on the 6th instant, M. Balard, of the Institute, occupied the chair.

M. PERROT DE CHAMEUX went through the correspondence, and in doing so first alluded to a letter from M. Liebert regarding a communication made by M. Despaquis at the last meeting. He (M. Liebert) expressed surprise at that gentleman having claimed priority with respect to the invention of an enlarging apparatus described at the November meeting. He said that his designs had been produced before M. Despaquis' patent was published. This he could prove, were it worth the trouble, which he did not esteem it, having since directed the attention of the meeting to a better plan than the one he had described before, and which was now abandoned.

M. DESPAQUIS said the matter was subjected to the judgment of the courts, and he therefore thought it better not to discuss it.

M. GRAND, of Briançon, gave the details of a process for obtaining a reversed negative without in the least injuring the original. He said it was a necessity to turn the negative in order to get carbon prints, and to avoid the double transfer otherwise necessary. It had been proposed to make a duplicate of the negative, and MM. Geymet and Alker had published a process of that nature, which the writer feared had too much diverged from ordinary methods of working to admit of its giving fine results in other hands than those of its inventor. Here, however, is a means, perhaps already known, of obtaining a negative directly from another negative. It is only necessary that the operator should know the alkaline development. The method is as follows:—Apply under the negative a dry plate prepared with bromised collodion; expose rapidly in the printing-frame, and develope with pyrogallic acid and ammonia, so as to secure a good positive transparency. Dip this positive in nitric acid diluted to half its strength with water. All the reduced silver will thus be dissolved, and there will remain on the glass only a very feeble negative image formed by mere reduced bromide of silver. Expose this image to the light until it has acquired the desired opacity, and then fix it with hyposulphite. You will then have a *centre type* of the negative which will contain every half-tone of the original. These negatives can also be modified, so that, should the original be too hard, the copy may be modified at will and rendered suitable for printing. The writer believes this method to be simpler than that of MM. Geymet and Alker, especially when it is desired to avoid granulation, and far better than Poitevin's process, which requires the use of the dark chamber and the lens.

The SECRETARY remarked that this ingenious mode of working had been already pointed out by Mr. Sutton in his papers contributed to the *Moniteur*.

M. Davanne, who, although absent, had watched the doings of the Society with keen interest, had written regarding some opinions expressed by the Chairman at the last meeting upon the causes of spotty photographs. In his letter he stated that those troublesome things had been met with in all countries. M. Balard had called attention to the spores which, being deposited on the paper, had formed the centre of the decomposition of the argento-organic matter, and to that and the facts cited by M. Franck de Villecholle he added some further observations. He had been troubled in his work rooms by the same defect with prints preserved in bundles, slightly moist, and before mounting. These had been treated with blotting-paper, and he attributed the spots to the action of *sporules* from that paper left upon the surface of the prints, which *sporules* developed the moment that moisture sufficient was allowed to have free action amongst them. With more regular drying these spots had disappeared. Thus they found both the theoretical explanation of M. Balard and the practical one of M. Franck confirmed. The blotting-paper was one of the causes of this phenomenon, although a less frequent one than metallic powders. The spots which he had observed on his prints had no central root, while oftenest on those that had been sent to him it was easy to see the black spot on the centre with its whitish aureole. A microscopic examination, aided by some chemical reactions, would, without doubt, permit them to comprehend the nature of those spots.

In the same letter there was a paragraph which the Secretary thought likely to interest most of the members. It was to the effect that, having noticed in the *Bulletin* a series of formulæ for dry collodion which had all a preliminary coating of dry albumen, he thought he might have something to say on the matter, as he had recently been working with the old Taupenôt process (in an excessively humid locality), in which he had found it absolutely necessary to use a preliminary coating. It was a very thin coating—merely the white of an egg mixed with a litre of water. That, indeed, was rather too attenuated, but used slightly stronger he had never any trouble from peeling. To this liquid was added a few drops of ammonia, and the fluid so prepared was poured on the glass just as collodion; and the ammonia acted as a lubricator, and enabled the liquid to flow with greater facility than a neutral or acid one would permit. A pint or so of this solution would serve for a great number of glasses, which would keep indefinitely.

MM. Rohaut and Hutinet had also sent a letter to the Society regarding the spots, communicating the result of their experience in the matter. To begin with: a photographer, of Montereau, named Massoule, stated that he had been troubled by this evil. He had sent them some prints, unmounted, which had been rapidly dried, and which they had put on cardboard at their establishment and cut in halves. One half had been sent to M. Massoule, who, at the end of five days, had sent them back all spotted, while the halves remaining in their hands were without alteration. And they further remarked that not only had the half photograph sent to the photographer been altered and spotted, but the cardboard itself had undergone alteration. It had yellowed, while those remaining in their hands were unchanged. The question was—To what is the alteration to be attributed? In their opinion, the question of place, as M. Constant stated, had a good deal to do with it. Could it be the humidity of the atmosphere? or the particular exhalations which haunted photographic workrooms? They did not pretend to answer the question, but it appeared evident to them that chemical research ought to assign the cause of the mischief to something quite other than the mount or the albumenised paper.

M. FRANCK said that his experience agreed with MM. Rohaut and Hutinet's; prints that remained good with him spotted when sent to other *ateliers*. He had sought to discover the cause of this, and learnt that the servant at that place had been in the habit of washing the floors of the workrooms, and the result of this had been that a moisture had been spread through the rooms, which had an action on the gelatine and produced the spots with great rapidity.

Acknowledgments were made of the feceipt of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the year 1874, and of other matters, with the thanks of the Society.

Some bromide emulsion pictures of Mr. M. Carey Lea's were presented to the Society by M. Davanne, with the wish that that gentleman might communicate his formulæ to the Society.

A letter was communicated by the President from the Secretary of the Aerial Navigation Society, intimating that a scientific ascent was being organised, in which it was intended to reach a great height, and to the success of this expedition it was expected that photography would contribute largely. In an earlier meeting of the Society a long discussion had been raised on the means of practically obtaining exact representations of the movement of birds in the act of flight.

M. GOBERT stated that it had been possible to photograph the trajectory of a projectile at Woolwich, but that the registration of the motions of a bird would be likely to prove a more difficult thing.

Along with a beautiful photo-engraving—a specimen of which is published in the current number of the Society's *Bulletin*, and which is an exquisite and lifelike portrait of M. Davanne—M. Roussilon sent a letter stating that MM. Goupil had sent 1300 prints for presentation. These prints were obtained by impression in *taille douce* on plates of copper, on which light alone had acted as engraver. These plates are totally without retouching, and, being hardened, may be printed from almost indefinitely without blunting.

The Secretary then proceeded to read his report on the history of the methods of pre-lighting, so much discussed of late. To this we shall return later. At the end of his minute,

M. FRANCK said that this pre-lighting applied to positive paper, even when it produced no apparent effect, gave more rapidity to the printing of positives and also greater softness. As regards the production of negatives, he further stated that, as it was very difficult to determine the time of exposure, so many elements entering into consideration, he might be permitted to allude to a suggestion by Dr. van Monckhoven, and which is analogous to that of Leon Foucault. It is to have a lantern, which may be opened for a longer or shorter time, and allowed to light the sensitive film. This will add much more to the exposure, and its length might be easily thus decided.

M. CHARDON made some observations on the collodio-bromide processes. He said that the following were necessary qualities in dry plates:—First, an easy mode of preparation; second, rapidity of exposure; third, a relatively long keeping quality; and, finally, the development, without being too rapid, ought to be accomplished within a reasonable time. He confined himself to the two first requisites for the most part. It was his opinion that images ought never to be long exposed to light, while all the details ought yet to be fully out. If an acid bath were used the development would take longer than if the bath were alkaline, and in reference to that there was an important point to be noticed. Development was often confounded with intensification. The development ought to reveal the image in every detail, while the object of the intensification was only to give free effect to the picture. From confusing those things it had often resulted, however, that negatives had been rendered hard through not being fully developed before intensification. In his (M. Chardon's) opinion, however, intensification was not necessary. Negatives were always much more harmonious, and would give a more perfect picture. For instance, he never required to intensify with the alkaline development, only most careful preparation is required, and plates must be calculated so as to give an opacity in the image. As regarded emulsion processes he did not agree in the opinion that "it could be very short." On the contrary, he had found that it required two or three times longer exposure than glass prepared in the bath. Colonel Stuart Wortley had got pictures in two or three seconds, it is true, but under what conditions? Only by forcing the development by a constant renewal of the solution, and, after all, the images were so feeble that much more time was necessary to bring them out than if they had been intensified in the ordinary way. He had heard it said that the glasses known as Wortley plates were good, but, so far as he knew, all who had tried them had been unable to work them to their satisfaction. And it was necessary, he thought, to point out that they were a commercial speculation—not things produced for the purpose of advancing the art of photography. Further: he had prepared some glasses according to the formula Mr. Stillman had submitted at the last meeting of the Society and with the collodion furnished by that gentleman, and he regretted to say that he had not succeeded with it. The preparation had the same faults which he had indicated. Perhaps the collodion had altered, or he was not handy enough, but, at anyrate, he had got nothing. The collodion was extremely fragile, and not a single film, as they might see, had endured the operations intact. Desiring to make some comparative trials, he had taken two negatives with plates prepared three months ago by Mr. Stebbing's formula. They were exposed three or four times less time, and gave very good negatives without any intensification. He did not wish to trumpet Mr. Stebbing, but those plates were undoubtedly well prepared, and he had not had time to prepare any himself. He concluded by calling on M. Ferrier to state the conclusions he had come to.

M. FERRIER said that he also had tried Mr. Stillman's collodio-bromide emulsion, and the results had in his hands been sufficiently good, but the process he found to be slow. It required at least double the exposure of the Taupenôt plates. He used the alkaline development.

M. CHARDON said he had done the same, but had used carbonate of ammonia instead of dilute pure ammonia, such as M. Ferrier employed, and that difference might perhaps have accounted for his non-success.

M. Derogy sent some samples of new lenses of his with accompanying proofs, which showed very good results; and M. Geymet showed some of his lithographic prints, which, he maintained, rivalled the best foreign productions. Compared with prints on the highly-polished albumenised surface these might seem rough, but they compared favourably with those on plain salted paper.

M. JEANRENAUD said German prints, of that kind at anyrate, would not keep without varnishing, for in the one that he had the image might be removed with the greatest ease. Thus the print was one in varnish rather than one in printers' ink as we understand it.

The meeting was then adjourned.

Correspondence.

MONSIEUR MAYER'S PRINTING PROCESS.—DR. VAN MONCKHOVEN'S ADVICE RESPECTING THE USE OF IODISED COLLODION FOR VIEWS.—*CHIAROSCURO* IN PHOTOGRAPHY.

MONSIEUR J. A. MAYER, of the Rue Neuve Saint Augustin, Paris—one of the large manufacturers of albumenised paper—has just issued a new *prix courant*, to which are added some minute instructions for the use of his paper, which I feel sure will interest many of my readers from the somewhat novel features which they contain.

The paper—Rives and Saxe—is of three kinds, viz., ordinary, extra-brilliant, and double albumenised, and each sort may be had either white, rose, or blue. The weights vary from eight to ten kilogrammes per ream. The mode of exciting, toning, and fixing is the same for the different kinds of paper, and the following is the process to be employed:—

The silver bath is to be from five to eight per cent. (twenty-two to thirty-five grains per ounce). Some carbonate of soda is to be added to it until a permanent precipitate is formed. It is then to be filtered. The paper is to be left three or four minutes upon the bath. The printing to be a little deeper than the print should be when finished.

The bath must be strengthened by ten grammes of a silver solution at twelve per cent. (fifty-three grains per ounce) for every whole sheet floated upon it.

The toning bath is made thus:—

Chloride of gold	1 gramme.
Acetate of soda	24 grammes.
Carbonate of soda	3 ,,
Distilled water	1,000 to 2,500 ,,

The solution must be made four or five hours before it is required for use. The prints are to be fixed in one part of hypo. to five parts of water, and left at least five minutes in the solution.

The following general observations are then added:—The bath must not contain any free acid. This must always be neutralised by carbonate of soda, and some of the precipitated carbonate of silver must always be left in the bath. If the solution turn red more soda must be added. It need not be stronger than five per cent. If its strength exceed ten per cent. drops and oily marks form upon the surface of the paper, which spoil the prints. After sensitising each sheet the ten grammes of strengthening solution must positively be added. The strength of the bath need not actually exceed three or four per cent. (thirteen to seventeen grains per ounce). In that case only one gramme of silver nitrate will be required for each sheet. The toning bath must be prepared several hours before use, and must be decidedly alkaline. The slower the prints tone the finer will be the result. Quick toning is very objectionable, and leads to many imperfections. A bath too new or too acid gives mealy prints. The papers, after being excited, should be dried slowly at a moderate temperature; and the finished prints should be dried slowly upon blotting-paper, quick drying being very injurious to them. Before being mounted they should be dipped again in water, and be mounted in the wet state.

Such are the instructions; but, strange to say, I have departed from them widely in using M. Mayer's paper, which is really good, and have obtained capital prints. I float them upon a sixty-grain bath, and find it much better than a weak bath; I never use acetate of soda in the toning bath, but carbonate only, and the bath is ready at once, and gives fine, rich, warm blacks; and, lastly, I avoid *most scrupulously* wetting the prints before mounting them, because that makes the cardboard cockle badly; and I prefer a solution of Nelson's gelatine in alcohol to any other mountant, because that does not cockle the cardboards *at all*. I have my doubts, also, whether a weak nitrate bath is really so economical as many people suppose, provided you save the washings and throw down the silver with bicarbonate of soda, so that it may afterwards be converted into nitrate by the mere addition of nitric acid, and without any trouble of reducing.

But there is room yet for improvement in the manufacture of albumenised paper and the mode of exciting it, so that it may keep well for a few weeks. I was the first to suggest the use of citric acid—that was in 1858—and I observed at the time that too much makes the paper transparent, as Mr. Turnbull has lately observed. If albumenised paper were salted with a mixture of chloride of sodium and citrate of soda, then, when excited and washed, there would remain in the paper chloride and citrate of silver, and I believe such papers would keep well and yield good results without any fuming. Too much citrate of soda would, however, make the prints very red and difficult to tone. I have found that paper containing a mixture of chloride and carbonate of silver has very bad keeping properties.

Dr. Van Monckhoven has lately been recommending, in the *Rivista Fotografica*, a return to the use of simply-iodised collodion for views. He says it is a mistake to suppose that bromide of silver brings out the greens better than iodide, and his advice is to give a long exposure, and never to mind how much the iodide solarises in the sky and high lights, because you can recover the lost density by intensifying afterwards.

I am afraid Dr. Monckhoven will be in the minority of one in the above opinion. It is needless to discuss the subject, for universal experience is now dead against him. What is to become of the details in the shadows whilst the solarised lights are laboriously acquiring intensity? Are not they to be intensifying also? And then what is to become of the balance of light and shade which constitutes the chief beauty of a picture? But one of the characteristics of modern art—to say nothing of photography—seems to be an unfortunate want of appreciation of the charm of *chiaroscuro*. Modern pictures too often suggest to my mind the spotty squares of a chess-board, or a window of painted glass. When is the world to see another Rembrandt? And when will photographers strive to produce *really* the effects of that great master, and not caricatures of his works? What a glorious study is light and shade, and yet how sadly neglected it is at the present day! What we want is more half-tone, and a greater economy of our whites and blacks. Two-thirds of every picture should be shadow, but we should "make our shadows equal light"— as Lord Byron truly said of Rembrandt.

Redon, February 20, 1874. THOMAS SUTTON, B.A.

THE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—It appears to me that the welfare of photography is of more importance than the constitution of the Council of the London Photographic Society.

Therefore, I suggested a plan which would, I think, be an excellent means of raising the status of photography higher than it now is, by uniting all its best men in a National Society of Great Britain.

No one was more anxious for "reform" in the management of the London Photographic Society than myself; but if that "reform" is to be obtained at the expense of the services of our most prominent men I should no longer consider it as "reform," but as most undesirable "revolution."

I am anxious to see Mr. Hughes and Mr. Stillman on the Council of the Society; but if they will not serve on it, and if all the old members are deposed, I again say that I see difficulty in finding men of the same calibre to fill ther places. H. STUART WORTLEY.

Rosslyn House, Grove End Road, London, February 24, 1874.

To the EDITORS.

GENTLEMEN,—Your surprise at the course Colonel Wortley has seen fit to follow in reference to the reform in the Photographic Society is not greater than that which *some* of the requisitionists have felt, though others predicted it from the beginning and avoided co-operating with him.

He distinctly avowed his wish and purpose of driving the old Council to resignation if it were possible, and this on the very evening of the meeting, so that the change in his sentiments must have been very rapid.

There can be no possible misunderstanding about it, for just before the discussion began on the evening of the resignation he said:—"Don't be surprised at what I do, as I want to put the Council in such a position that they must resign if the amendments are carried."

He was certainly successful in that aim, but he will surely pardon our surprise at the course he has since taken.—I am, yours, &c.,

8, *Altenburg-gardens, Clapham Common, London, S. W., February* 21, 1874. W. J. STILLMAN.

To the EDITORS.

GENTLEMEN,—So the London Photographic Society is in the throes of a revolution, and, like a rotten edifice when repair is attempted, stands in considerable danger of falling to pieces. If this fate should overtake it, so far as scientific photography is concerned it will not be missed, though perhaps it may be mourned by a few among its office-bearers, who have proudly strutted before their fellow-photographers clothed in a little brief authority. Whether over its grave we may approvingly write *"resurgam"* is a question; and if it is only to rise again on the old basis of working, the longer its resurrection is postponed the better.

Looking from the outside at the struggle going on between the "ins" and the "outs" there seems but little choice between the two parties—there is no real battle of principle at stake; and, for aught the public can see, looking at the elements of which the Society is composed, the new Council of the "outs," if elected, is likely to be of very much the same character as the "ins," the difference being no more than that "'twixt tweedledum and tweedledee." If a number of individuals like to subscribe a guinea a year for the privilege of talking shop details and devising how best to render their wares attractive to the public no one has a right to gainsay their action.

But the Photographic Society, though in fact but little more than this, claimed to have higher aims, and to rank as the guiding star of photography among the scientific societies of the metropolis, and such has been constantly trumpeted forth from the chair by its President. Besides, aping its betters, it publishes, as a necessary adjunct to its dignity, a journal in which appears periodically what are magniloquently termed its "Transactions!"—a trumpery, ill-digested mass of six pages of type without order, without method, and generally without matter, for where could matter come from when there was little or no matter in its proceedings? In this light the proceedings of the Society are public property and amenable to public criticism. A perusal of the "transactions" shows that such a thing as scientific action is almost ignored.

Speaking generally (of course there may be exceptions), no real investigation or research of a scientific or accurate character appears to have been carried on by the Society. If, however, some one prying into the secrets of its archives should happen to dig up something of the kind it would simply stand forth as the "exception" which "proves the rule." And yet where is there a more abundant field to be found? The chemist, the physicist, the astronomer, the microscopist, and all students of natural science have a deep interest in the subject; but where do their several specialties find place in the Society's proceedings? Light and optics present a wide field of research of the deepest interest to the photographer. The spectroscope, we are told by its great apostle, Lockyer, is comparatively powerless without photography, and that the unaided eye cannot be depended on. The votaries of all these branches of research are "conspicuous by their absence." To attempt to discuss such subjects before the present Society would simply empty the rooms; for it may be well doubted if there be six persons amongst its members who could take an interest in such matters.

Be it understood, however, that the practical element is not to be ignored—its help is most essential; to bring the two together—the scientific and the practical—would be invaluable to each. Take, for instance, the transit of Venus at the present time. The question now being how to photograph that event—whether by the wet or dry process. What are the merits and demerits of each, what experiments are needed, what corrections to be adapted with regard to the contraction or expansion of the films, and many other conditions, require investigation, and where so proper as a real photographic society for such a question or for such an investigation to be undertaken? Here the practical element would be of vast assistance to the scientific astronomer, who, in very many instances—indeed, very commonly—with every desire to bring photography to his aid, is ignorant of manipulatory details familiar to his practical friend, whether professional or amateur, who, in his turn, needs to have pointed out to him the conditions and requirements of the problem to be solved.

A score of other investigations might be pointed out where a *true* photographic society might be of use. The present body is simply a sham. Is there any hope that the new Council of the "outs," assuming they get in, will do better than the old? Certainly not, unless they can gather around them and into the Society the workers in the various directions intimated above, and who at present hold aloof, caring little to mix themselves up with mere takers of portraits and dealers. The scientific element, if it ever existed in it, has long since deserted it. The only few representatives of the class who nominally remain are life members, and therefore do not retire; but they take no part in its trumpery proceedings.

In art, too—about which photographers are ever babbling—is there any one belonging to the Society who by training, education, and culture takes any position in the world of art? It is true there are men in the Society, both amateurs and professionals, especially the amateurs, who, by a sort of instinct or natural gift produce clever and highly meritorious works; but, when they put themselves forward, as is too much their wont, as rivals and equals of Royal Academicians the world simply laughs and points to the fable of the frog and the bull of our old friend Æsop.

Some time since the writer was present at a meeting of the Society when a paper was actually read before this scientific and artistic body on a method of making graduated backgrounds, and some special mode of rubbing photographs with charcoal and pumice powder, or some such materials, to produce a smooth effect, and smother the careless work of the photographer—in fact, a species of adulteration enabling such work to be palmed off on the public as "nice" photography. Plate-cleaning, too, was the subject of a lively and learned discussion, and this was carried on with all pomp and solemnity, as if the affairs of the nation had been under discussion in the House of Parliament.

Unless the Society turns over a new leaf, and the Council, whether new or old, can gather around it a very different class from that which has hitherto taken part in its proceedings, the sooner it is buried the better.

Since writing the above, I see by the last number of *Nature*, which has been put into my hands, that the Secretary, true to the irrepressible instincts of the genus, has been digging up matter from the archives of the Society, and has, with more haste than discretion, rushed to the rescue with a list of the *scientific* doings of the learned body he represents. But, alas! his instances are a clear proof of how little the Society has done in the way of scientific research.

His first instance is a discourse by the President, in which he professes to give a description of the photographic operations at the Royal Observatory, in which nothing whatever novel was described, and which might have suited the lecture-table of some mechanics' institute. The special correspondent of the *Daily Telegraph* would have made a more amusing, and an equally accurate and instructive, article under the head of *A Visit to Greenwich Observatory*. Talk of it as a contribution to science—"bosh!" It does not seem to have been thought worthy of publication in the "Transactions."

To the next the name of Professor Stokes gives the highest lustre; but the Professor himself would be the last to claim for it any novelty, or treat it as a contribution to science. He would laugh at the notion. It was simply a good-natured attempt to explain to the *oi polloi* how their object-glasses are corrected; and, admirable as it was, I fear there were few among the audience who could appreciate its merits.

We then come to *A Contribution to the Early History of Photography*, by the Secretary, against which not a word can be said except that there was nothing scientific in it.

Uranium Printing, by John Spiller, was short, and told nothing new; more—a great deal more—on this subject had appeared long since.

Lieut. Abney's paper *On the Chemical Theory of the Latent Image*, no doubt, comes strictly within the class of subjects suitable for the Society, and, doubtless, in the hands of so accomplished a photographer and member of the scientific corps, must have been worthy of any photographic society. I chalk up one to the Secretary here.

Improvements in Carbon Printing contained no new scientific facts, though, no doubt, an interesting practical paper; but it was not out of the prevailing rut.

Remarks on Three Wet Processes—another paper instanced by the Secretary—had no science in it whatever; and if Mr. Jabez Hughes be the intelligent gentleman I remember in former days as a photographer of consummate ability I feel assured he would never put himself forward as a representative of science. Still running in the one rut.

Photocollotype Printing, by Captain Waterhouse, is an excellent practical paper, and quite fitted for discussion in the Photographic Society, and no complaint can be raised against it—nay, on the contrary, all praise is due to his exertions; but still running in the one rut.

As for *Photography in the Arctic Regions*, by Lieut. Chermside, it taught no scientific fact whatever. He went out knowing little or nothing of photography and ill provided, and, in addition to his want of knowledge and proper appliances, he had to struggle with the difficulties of climate. Again in the one rut.

I have not a word to say against the list generally; but it deals with one class only, and thus presents the strongest evidence in favour of my argument—that the Society practically ignores science, and omits to deal with the numerous branches of science into which photography now extends its reign. JAMES ONSLOW.

Rue de Namur, Brussels, February 21, 1874.

[Our readers will be as much surprised as we were that anyone in Brussels should be so well acquainted with, and take so much interest in, the doings of the London Photographic Society. Were it not for the envelope bearing the obliterated Belgian postage stamps we should have surmised that the letter had been written in the neighbourhood of Charing-cross. Mr. James Onslow, be he who he may, strikes much deeper than the "reformers," who have only contended for an amended constitution of the Society which would permit the old "ruts" and ancient traditions to be departed from. In this he does them an injustice, if, indeed, he understands the full scope of their programme. To call these the "outs" and the former rulers the "ins" he misrepresents both parties, as the struggle has not been one for office; the "outs" did not wish to displace the "ins," but only so to alter affairs that the members generally could have an effectual voice in the management of the Society. All the evils he complains of have arisen during the *régime* of the "ins," and he prejudges if he supposes that the same errors will be perpetuated under a new system. If by the "outs" Mr. Onslow means those who have been working to produce a more vigorous action of the Society, he must include himself in his own condemnation, for he will find among the "reformers" men who exactly share his own views. Unlike him, however, instead of destroying the old organisation they seek to reconstruct it on an enlarged basis, so as to permit fresh blood frequently to be added to the old stock, that it may do all the useful things that he suggests, and much more. With the main part of his letter we entirely agree, but his sharp criticism applies not only to this Society, but to all photographic societies. In short, the whole subject as to how photographers generally, and photographic societies in particular, can by organised action improve the art and raise the science is too important to be treated in a notice like this. We may have an article on the subject next week. In the meantime we urge upon all not to adopt the easy task of condemning the shortcomings of others, but to aid in the much higher work of effecting improvements in every direction.—EDS.]

To the EDITORS.

GENTLEMEN,—It is with some regret that I find myself in starting at issue with the members of the Committee who have been elected by the Photographic Society, with the new Council, to revise the rules for its conduct.

I feel strongly that, under the circumstances which have brought about an event without precedent, viz., the resignation of all the officers of the Society, it would be most desirable and politic, before presenting new rules at the next meeting, to test the feelings of both the metropolitan und country members, by circular, as to their views regarding the one point about which the retired officers and the requisitionists are at variance, and then to act on the result so obtained.

As this suggestion has not, at present, met with a favourable response, I am obliged, as one of those who voted with the Council, to withdraw from the Committee at this stage of its proceedings.—I am, yours, &c.,

10, *Pall Mall, London, February* 10, 1874. RICHARD W. THOMAS.

To the EDITORS.

GENTLEMEN,—As an amateur, in the truest sense of the word, of photographic art and science for more than twenty-five years, I have seen with much regret the contest which has lately been going on between the Council and the members of the London Photographic Society. Still, as having never been in any way connected with that Society, I should not have intruded on the ground of contention had I not entertained the hope that possibly the impressions of an old and experienced and perfectly independent spectator might serve to restore peace and confidence, or at least to induce such counsels as may prevent our favourite science from losing the public services of some of its most distinguished scientific ornaments. I for one must wish sincerely that those gentlemen who have retired from the Council could be induced to remain amongst its members. I am quite sure that they would have no reason to fear neglect nor depreciation at the hands of so large a body of gentlemen as the members in general, under even the most popular system of legislative election.

I may venture, without breach of confidence, to refer to the government of that Society over which for so many years I continued to preside by the free and annual election of its members—the Manchester Photographic Society. All the officers of that Society are annually elected by the whole body of subscribers. Each member has a list on which he marks the names of those for whom he votes as President, Vice-Presidents, and members of Council. The majority decides the election. There are no complaints, no heartburnings, nor dissatisfaction; and yet I may safely say with respect to all—except my unworthy self, who was too kindly and partially elected—that the governing body has been composed of the most eminent, useful, and disinterested gentlemen who could be chosen to conduct the affairs of a scientific society. Again and again have the old officers been elected; but every time their election has only confirmed the high appreciation in which their services have been held by the general body of subscribers. And this is the more remarkable because that Society is composed of professional and amateur members without any limit. But I must say that during the whole time in which I had the honour conferred upon me of being its President, my connection with the Society was marked by the most pleasing and unalloyed satisfaction—united action, harmonious proceedings, delightful evenings, *soirées*, and continual progress, marked by the entire absence of party feeling and by the continued prevalence of gentlemanly and friendly intercourse. Long, long may the Manchester Photographic Society continue to be worked by the same sure elements of success and prosperity!

On the other hand, I have been connected as honorary secretary during five-and-twenty years with the council of a very large and important public educational institution in which the council is self-elective, and its proceedings only subject to approval at an annual general meeting of life governors (of whom it is in general hard to get a quorum together), and I feel equally bound to record my testimony as to the perfect unanimity and co-operation of that body of influential gentlemen, and to the great success and general satisfaction which have attended their disinterested labours.

I think we may also refer to a public institution which is much more to the point, viz., the Royal Academy of Art (of which my father was one of the earliest and oldest academicians), in which the council is strictly self-elective and in which it would be difficult to say that by any other constitution of its body the interests of high art could be better or more harmoniously secured. Where the council is composed, in the first instance, of the most eminent and experienced members of a profession, the best interests of a society are almost certain to be promoted by such a governing body, their united judgment and general love of their profession combining to raise their proceedings above the suspicions of selfish, interested, or party motives.

I can, therefore, quite understand the members of a council long established upon either principle resisting the first attempts to change its constitution; and when such change is urged under the imputation of corrupt practices, partial adjudication of prizes, cliqueship, and the like, there are very few councils composed of eminent and honourable gentlemen who would not resist, as far as possible, a compulsory revolution in its original constitution. I am persuaded that it is to the introduction of these personal and unworthy charges, much more than to an aversion towards the proposed alteration itself, that we must attribute the motives which have induced the Council of the London Photographic Society to act as it has done. I really cannot view the conciliatory proposal to unite with the members who signed the requisition in making a friendly reform in the constitution of the governing body in the light which the Editors have adopted. I very deeply deplore the editorial article in your number of the 6th instant, headed *The Victory of Reform in the London Photographic Society*, unless you really wished to drive away from that Society every gentlemanly and distinguished member of its Council, and so to inflict upon it and the high interests of photographic art connected with it a very severe blow. But, now that party strife has for a season sunk to rest under the "victory" you celebrate, do let me, as an old and most faithful lover both of peace and the most peaceful of arts, urge upon all parties *that* mutual forbearance, forgiveness, and concession to each other's mode of thought and position which may bring back unity and co-operation.

I cannot gather from Colonel Wortley's letter, or your strictures on it, in the Journal of the 20th inst., that the gentlemen he names have left the Society, but only that at present they decline to serve again on the Council. I think it a very great pity that his suggestion to the reforming body as to requesting those members of the Council to reconsider their resignation was not adopted. I see no anomaly whatever in the gallant Colonel's position, so far as I gather it from the Journal. I conceive him to have been anxious to urge concession on the Council, and to have advocated a policy of freer election in the future government of the Society; but certainly not so as to give personal offence to those gentlemen who had so long and, judging from their report, so ably conducted its affairs. It seems to have been the part of a sincere promoter of constitutional reform who would shrink from a violent republican revolution. I heartily wish your present expression of "trust that the time is not distant when many, if not all, of those gentlemen will resume the honourable positions which they have previously held" may be realised.

But, whether or no—whether in connection with the London Photographic Society or not—I really must unite my humble voice with those of Colonel Stuart Wortley and Mr. Sutton in suggesting that it is quite time that photographic art should have its "British Society." I would suggest that, in addition to a central council of the most eminent photographers, the presidents of all the regularly-constituted societies of Great Britain should be *ex-officio* members; that the society should hold an annual meeting and exhibition in one of the principal cities, to be yearly selected; that papers upon the most interesting topics connected with photography should be read by eminent men previously selected by the council, and discussion invited, after the custom of the British Association; that the local arrangements be left to the principal photographic society of that city; and that there be always a great concluding *soirée* at the exhibition. I believe such a society would do much to stir up and benefit all the local societies, and to advance the best interests of photographic art. In such a society, as in the Royal Academy, there would be no objection to a central fixed council of really eminent photographers, whether professional or amateur, as the addition of the presidents and (if desirable) the elected representatives of the several local societies of England would be quite sufficient to secure that admixture of the popular and electoral element which it is so desirable to maintain.—I am, yours, &c., St. VINCENT BEECHEY.

Hilgay Rectory, February 23, 1874.

[We are sure that our readers will cordially endorse the general sentiments contained in the foregoing letter. Every endeavour to heal the differences between the members of the London Photographic Society must commend itself to all, and especially when expressed in such a genial spirit. But while the Rev. Canon deplores the result, he hardly recognises the causes that led to it. We have no intention of reopening the whole question, but Canon Beechey must admit that even peace may be purchased at too dear a price. It is to be regretted that the ex-members of the Council resigned when a vote was carried against them; but it would be a more lamentable result still if members, feeling they had a grievance and had been badly treated, should not have the courage to resent it. There are many causes—to which it is undesirable to refer in print, but of which the metropolitan members are fully aware—that have conduced to the present state of affairs. Neither country members nor outsiders can fully understand all the circumstances; therefore, they must be lenient in their criticisms. Whatever merits there may be in the Sutton-Wortley scheme of a national society, or whether, if started, it would have a more prosperous existence than the moribund "Dry-Plate Club" which Colonel Wortley projected, are points we shall not now discuss. The present moment we do not consider a happy time to do more than merely to broach the subject, as some of the gentlemen whose names have been mentioned probably could not now be brought into harmonious action.—EDS.]

A PLEA FOR SAFETY BURNERS.—The *Ipswich Journal* records a terrible oxyhydrogen gas explosion that took place at the Sudbury Lecture Hall. It shows eloquently the danger arising from allowing the gases to be mixed. On Friday night, the 30th ultimo, about nine o'clock a loud explosion was heard, and it was afterwards discovered that the Lecture Hall in Station Road had been in imminent danger. It seems that on Friday night the children (to the number of 600) attending the British Schools of this town had been entertained within the walls of the Lecture Hall with a display of dissolving views, Mr. J. F. Hills, the indefatigable postmaster, being the exhibitor. After this portion of the programme had terminated, and the children had departed to their respective abodes, Mr. Hills, as may be supposed, was left alone, and was accordingly making arrangements for the removal of the apparatus, and was engaged in letting off the gas, when a tremendous explosion took place, rendering the position of Mr. Hills perilous in the highest degree. There were two bags containing gas—one oxygen and the other hydrogen. The bags used in this instance are said to be of a very ancient character, and unlike those made in modern times. The pipes on the bags are connected, causing the gases to be intermixed. A fifty-six pound weight had been placed on the hydrogen bag, and not being heavy enough to let off the gas it was removed, and Mr. Hills mounted it himself, and by that means the gas was let off without any visible signs of danger. Mr. Hills eventually having replaced himself on the stage, was about packing up the various appliances, when suddenly a very heavy crash was heard, and the gas of the Hall being extinguished, the room was left in total darkness, Mr. Hills remaining in a partially unconscious state, and gazing around in "dark despair." Thirty-six panes of glass were blown out, a portion of the stage boarding displaced, and it was remarkable, too, that a piece or more of wood ascended to the ceiling the same distance off, and lodged there, a hole which the wood had made only supporting it. Again: even a more remarkable incident occurred, and which will doubtless surprise many of our readers, when we state that the magic lantern, which had been standing on the table, was blown up, and lodged itself on a couple of rafters forming the top of the framework designed for the annual dramatic plays. Mr. Hills at length succeeded in reaching the door, and rapidly made his way home. On Saturday the Hall was visited by many persons, and the marvel was how Mr. Hills could have so fortunately escaped without death or hurt of any kind, the shock seemingly only having taken a slight effect upon him. The damage is estimated at about £10, which is covered by insurance in the Suffolk Alliance Office.

EXCHANGE COLUMN.

Wanted to exchange, a few good photographic lantern slides.—Address, H. COOPER, 54, Bridge-street, Northampton.

I have various lenses and cameras which I wish to exchange for furniture or other goods.—Address, Mr. CASS, 73, Victoria Dock-road, Canning Town, E.

A double dark slide for plates $9\frac{1}{4} \times 7\frac{1}{4}$ inches, quite new, offered for card specimens or any useful thing in photography to value. Must be good.—Address, HENRY ORD, photographer, 8, Princess-street, Stockton-on-Tees.

A square half-plate walnut camera, with two dark slides, in good condition, in exchange for a camera suitable for two *cartes* on one plate. One volume of the *Illustrated Photographer* in exchange for *Photographic Dictionary*, or any reliable work on photography.—Address, WM. CRUICKSHANK, Rothiemay, Huntly, N.B.

ANSWERS TO CORRESPONDENTS.

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

*** We have to acknowledge the receipt of several letters which have been received too late to admit of insertion or notice in this number. Among the communications left over till our next from this cause are those of Captain Abney, J. W. Gough, W. E. Batho, "A. J. W.," Samuel Fry, "Pilgrim," J. Adam, and B. J. Jefferson. We are also compelled, owing to unusual pressure on our space this week, to leave over some critical notices.

A. J. Corrie.—The workmanship is of a high class; hence the high price.

Jas. Thomas.—The "offer" is so sadly insufficient that we must decline to insert it.

Philo-Photo. inquires if any brother reader will oblige him with a receipt for bleaching ivory which has become discoloured through age.

The Photographic Society.—We have to acknowledge the receipt of a great number of letters on this subject. Out of consideration for our general readers we abstain from publishing all except a very small number.

Mr. M. Carey Lea.—Our readers will be glad to learn that our able American correspondent has resumed his communications to this Journal. We have just received an important contribution from Mr. Lea, which will appear in our next issue.

John L. Laughton.—The special description of asphaltum used in the production of photographic engravings is that well-known in the drysalters' trade as bitumen of Judea. It may be procured from any drysalter—certainly in Long Acre. We are not aware of its present price, but it is very cheap.

Alpha (Hornsey Rise).—England's dry-plate process consists in collodionising the plate, exciting and washing it, and then pouring over the surface a little diluted albumen, which must be washed off. This is followed by the application of a solution of aceto-nitrate of silver, which in turn is also washed off, after which the plate is dried.

S. E. D.—The oxide of manganese used in the preparation of oxygen gas is the black oxide, known also as the binoxide or peroxide. There are five oxides of manganese, which differ from each other in the relative proportions of oxygen and manganese. Manganic hydrate may be produced by heating the binoxide to whiteness, or by exposing the protoxide or carbonate to a red heat in an open vessel.

Gorgon (Brighton).—About twenty years ago there was a photographic society in Brighton. It was designated the *Brighton and Sussex Photographic Society*. How long it existed, and why it ceased to exist, we are unable at present to say; but from the great number of amateur and professional photographers in Brighton there should be no difficulty in organising a powerful and most efficient society.

Robert Fletcher (New York).—It is quite a mistake to use a slit in the diaphragm instead of a circular aperture; and no optician who is aquainted with photographic optical science would for a moment advise it. Ideas, which experience as well as theory proved to be quite untenable, were at one time freely indulged in respecting alleged advantages arising from the use of stops with triangular and bottle-shaped apertures; but these whims have for a considerable time ceased to be indulged in.

Mary B.—1. By having the position of the stop of your lens altered so as to bring it three-quarters of an inch nearer to the lens than it is at present it will cover a 15 × 12 plate very easily. True, there will be a want of sharpness towards the margin compared with the excellent definition you now obtain, but that can be obviated by using a smaller stop.—2. The articles referred to will be found in our Almanac for 1870. We are at present unable to give a definite reply to the other question; but we understand that the publication will probably take place in April or early in May.

Auld Reekie.—We have doubts as to the possibility of obtaining a correct or pleasing likeness of any sitter illuminated by divergent rays emanating from a point; and for this reason we advise you to keep the magnesium light in motion during the whole period of exposure. It is quite possible to take portraits by magnesium light equal in respect of quality to those obtained by daylight; but a special arrangement is required, and the expense is nearly six times greater than that incurred when taking a portrait of a person lighted by means of any of the magnesium lamps at present in use.

W. J. S. (Birmingham).—This correspondent asks:—"Will you kindly inform me, through the medium of your Journal, as to the best substance to put on the two or three side windows of my studio? I want something that will not obscure the light too much, but will prevent my being overlooked by persons on the outside."—In reply: any of the varnishes prepared and sold for imitating ground glass will answer the purpose. A formula for varnish of this kind will be found in our Almanac for the present year. A *mixture* of starch and water (not a solution) applied to the glass will also answer the purpose. Probably the best plan to adopt would be to glaze the sashes with fluted glass, which obstructs no light, but prevents anyone from seeing through with distinctness.

Amateur (Limerick) writes as follows:—"Theoretically, ought the sensitiveness of a gelatine emulsion prepared by Mr. King's formula to increase in proportion as the silver and bromide are increased? With some plates of the above kind prepared with an emulsion containing twenty grains of silver, fourteen of bromide, and fifteen of gelatine per ounce, about three seconds, exposure on a clear day with a portrait lens and half-inch stop proved sufficient. There was no alcohol, which seems superfluous, as the deposit of silver becomes as fine as possible if the emulsion be well shaken. I should be glad to know if you are aware whether the above exposure is less than Mr. King gives his plates under similar circumstances. Almost any amount of intensity and variety of shade, from a deep black to a warm brown, seems obtainable by using bichloride of mercury and ammonia of different strengths to intensify such plates."——In order to estimate exactly the degree of sensitiveness obtained we should require to know the focus of the lens.

F.R.S.—Collodion can most undoubtedly be made with wood naphtha. This we proved in the most absolute manner, a few years ago, when a bill was successfully brought before parliament to impose a heavy duty upon methylic alcohol after it had been deodorised. We tried numerous experiments with wood naphtha purified by Eschwege's patented process, and found that it dissolved pyroxyline quite as rapidly as strong ether, and we demonstrated its great solvent powers at a meeting of the South London Photographic Society. Notwithstanding all that, we prefer ether and alcohol as solvents of pyroxyline.

Lecturer.—To exhibit the development of a collodion picture in public all that is necessary is to have a glass vertical trough fitted in a magic lantern, with a plate of orange glass intervening between the light and the trough. The exposed plate is placed in the vessel, and a weak developing solution is then poured in, when, if the focus has been previously adjusted, the gradual formation of the image is seen upon the screen. In order that the experiment may be sensational, the collodion should be of a very intense kind, and be very lightly iodised, so as to secure the utmost contrast. It is better, too, when the picture developed is a transparency rather than a negative.

J. R., Junior.—While we do not recommend any special formula for the preparation of *lichtdruck* or heliotype plates for mechanical printing, we are in a position to say that the fine pictures produced by Mr. H. T. Smith, to which reference was made, were done by coating the plate with the following:—

Gelatine	10	parts,
Sugar candy	5	„
Neutral chromate of potash	5	„
Water	100	„

When dry, the plate was exposed under the negative for about twenty minutes; it was then immersed in water, and, after being allowed to become dry, was handed over to a lithographic printer, by whom the proofs were printed.

A Country Reader.—It is a peculiarity with all prints obtained upon plain paper that they lose upon drying much of the lustre they possessed while wet. By adopting any means by which the picture can be retained upon the surface of the paper brilliancy will be secured. By the application of an encaustic paste, composed of wax dissolved in any convenient solvent, a high degree of lustre may be given to a previously-dull picture. The following is the formula for the encaustic paste used by M. Adam-Salomon:—

Virgin wax	500	parts.
Elemi	10	„
Benzole	200	„
Essence of lavender	300	„
Oil of spike	15	„

The above may be simplified without impairing its efficiency.

Received.—Mr. Morley's *New Price List of Lenses and Cameras*. It is a wonderfully-comprehensive catalogue.

Royal Institution.—On Friday evening, the 20th inst., Mr. Vernon Heath delivered a lecture on the autotype processes of photography. In the course of the lecture two large carbon pictures were developed by Mr. J. A. Spencer and his assistants amid great applause. The lecture was very successful, and we shall give a report of it in our next.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 4	Edinburgh	The Hall, 5, St. Andrew-square.

METEOROLOGICAL REPORT,

For two Weeks ending February 25, 1874.

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

These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb	Max. Tem.	Min. Tem.	Remarks.
12	30·12	SE	—	31	47	24	Frosty
13	30·06	SW	46	47	50	30	Dull
14	29·82	W	47	49	51	46	Dull
16	29·51	SW	46	48	49	44	Dull
17	29·27	SW	43	45	47	43	Rain
18	29·64	WNW	34	35	—	32	Dull
19	29·96	NNE	35	37	46	34	Fine
20	30·17	NW	—	31	44	29	Foggy
21	30·11	SW	37	39	50	30	Fine
23	29·85	W	42	43	46	42	Rain
24	30·06	NE	42	43	45	42	Dull
25	29·90	SW	35	36	—	33	Fine

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 722. Vol. XXI.—MARCH 6, 1874.

PHOTOGRAPHIC ENGRAVING.

We have frequently described such processes of photographic engraving as have stood the test of successful practical application, and we may add, with bated breath, that we have also described many patented processes which have not stood the above test. It is the duty of the journalist to record all that transpires; the careful experimentalist soon separates the wheat from the chaff. Numerous inventions or modifications of inventions have been ushered in with revolutionary trumpet-sounding only to be dissipated like smoke when the wind of practical experiment and utility blew upon them.

As a set-off against a process not of, but connected with, photo-engraving of which we, in our last number, were compelled to speak rather disparagingly, we now purpose giving the outlines of a method which, for some time past, has borne the brunt of actual practice in the hands of Mr. Thomas West, recently of the Heliotype Company, and who has kindly furnished us with the details.

The method in question is nearly similar to, although it differs in detail from, the original process of the late Herr Paul Pretsch, inasmuch as relief in the block is in both the result of the swelling of gelatine in some portions, and its resinification, so to speak, in others.

We pause here for a moment to remind, or possibly inform, those who have not made experiments in this direction that if an even surface, say of glass, be varnished with gelatine and bichromate of potash, and when dry be exposed to light under a negative, although but little change of colour is caused by such exposure an important change has really taken place in its physical structure, in consequence of which simple immersion in cold water converts the nearly invisible and flat picture into one having very decided relief, some portions being swollen and raised up from the plate while others are quite sunk and unaffected, this taking place in exact proportion to the amount of light that was allowed to fall upon the sensitive layer by the negative. From a picture thus obtained in which the lights and shadows of nature were converted into prominences and depressions, into hills and valleys, it only remained to effect the further conversion of such a surface into one sufficiently hard to withstand the wear and tear of the inking roller and the printing-press. The intermediate stages between the soft gelatine and the metallic block have afforded ample scope for the talent and ingenuity of numerous experimentalists, who have discovered and re-discovered, modified and re-modified, processes tending to this end. And so great has been the measure of success attending the investigations and labours of some who have entered on this field of experimental research that, judging from several specimens in our possession, we are almost tempted to exclaim, in the language of hyper-conservatism, no further advance can be made.

In the process communicated to us by Mr. West—who, we may state, is now *en route* to America—no claim is made for securing better results than were previously obtained, nor for any special novelty in applying principles already recognised. He merely gives it as a method by which in the production of surface blocks for printing in connection with type some labour may be saved. The subjects suitable for printing blocks of the kind now to be described are those known as "line-and-dot subjects;" that is, pen-and-ink sketches, line drawings, engravings, and suchlike, to the exclusion of objects in pure graduated tint like a silver print from a negative of a natural subject having gradation of tint.

A plate of glass is coated with a solution of beeswax in ether, the relative proportions of the two being about half-an-ounce of wax to ten ounces of ether. This leaves a very thin coating of wax upon the plate, which is still further attenuated by rubbing with a cloth. The object of this waxing is to prevent a too close adhesion of the gelatine coating to be next applied.

To prepare the sensitive surface, gelatine is steeped in water for half-an-hour or upwards until it has become swollen from the absorption of water; most of the superfluous or unabsorbed water is now poured off, and the vessel containing the gelatine is placed in hot water, or otherwise subjected to heat, by which the gelatine immediately becomes liquefied. To this is added sufficient of a saturated solution of bichromate of potash to render it of an orange colour, yet not sufficient to cause the salt to crystallise out and show itself upon the surface of a glass plate coated with the mixture. The film is dried and then removed from the glass, which is permitted to be done by the agency of the wax substratum. It is now ready for exposure.

Suppose, now, that a reproduction of an engraving or piece of ordinary print or sheet of music be the subject that is to be produced: a *transparency*—not a negative—of this subject must have been obtained and superimposed upon the side of the gelatine pellicle next to the glass plate. After exposure to light for a quarter of an hour—or more or less, according to the light and the quality of the negative—this gelatine film is pressed into contact with any handy flat surface, such as glass or metal, care being taken that the surface that was next the negative be placed outside. It is now sponged copiously with, or immersed in, cold water, by which a considerable amount of relief is obtained, the parts corresponding with the blacks of the original print or drawing being seen standing in high relief, while the whites are sunk. This, it will be seen, supplies the conditions for a surface block to print in connection with type, all that is now wanted being the conversion of the soft gelatine into hard, unyielding metal.

The gelatine relief or mould obtained in the manner described is, first of all, made surface-dry by means of bibulous paper, and is then lightly dusted over with finely-pulverised plumbago or bronze powder. A cast from this surface is then taken by means of molten beeswax, which, when cold, readily parts company with the gelatine relief, owing to the intervening sprinkling of plumbago or bronze. This wax cast is then sent to the electrotyper, who, in a few hours afterwards, will deliver a metallic cast, mounted upon wood and ready for working in the printing-press.

THE REPRODUCTION OF NEGATIVES.

Our readers will have perused with considerable interest an article in last number from the pen of our indefatigable correspondent, Mr. Thomas Sutton, upon a means of reproducing negatives, which is, in some respects, somewhat at variance with the result of our experience as narrated in an article in our issue of February 6th. As, however, our object is to draw attention to anything which may tend to the improvement of any process connected with our art-science irrespective of any preconceived notions we may have entertained, being always ready to appreciate any information having that tendency, we feel especial pleasure in calling attention to the article referred to, since there is much probability that the mode suggested by our friend and correspondent will be found to possess points of superiority over the method we had ourselves seen practised.

To the ordinary wet collodion process which produced the results we had witnessed Mr. Sutton takes exception, and with some show of reason; for we certainly have observed that plates treated with preservative of any kind have always possessed a *sharper definition*, other conditions being similar, than negatives made with ordinary wet collodion. Whether this result be due to the *condensation*, so to speak, of the film itself, rendering the pellicle upon which the action of light is registered thinner than the usual film, which retains the porous character it first assumes upon its formation in the nitrate bath, we cannot decide; but the fact seems certain, and for this reason alone the mode so strongly advocated by Mr. Sutton may really prove more advantageous in use than the wet collodion we saw employed. Good as these results undoubtedly were, it is open to question whether they might not have been surpassed in quality if the mode recommended by Mr. Sutton had been employed for their production.

We do not intend to let this matter drop, but recur to it from time to time, and shall be happy to hear the results of any experiments made by our readers in this direction with reports of which they may kindly favour us.

FORTHCOMING MEETING OF THE LONDON PHOTOGRAPHIC SOCIETY.

The proceedings of the next meeting of the London Photographic Society will be watched with interest. The members will have to elect officers of the Society in place of those resigned at the last meeting. As the rules stand, this election must be made by the members present at the meeting; the issue lies, therefore, chiefly in the hands of the metropolitan members. It is probable that it will be the last election of the kind, as, when the new laws are framed, all the members, whether resident in London or not, will equally be able to nominate and vote.

When the Society last separated party feeling ran very strong. Two sections were formed among the members, and much angry feeling since exhibited has helped to foster the division. The officers now to be elected may be chosen from either of these parties, for they each contain a sufficient number of able men; but this course would scarcely be a satisfactory one, as it would lead to an establishment of a sort of party politics in the Society injurious to its prosperity. It should be the duty of the independent members and the moderate ones on each side to effect a fusion. As all are agreed that the Society must be reorganised, and as the differences can only be on points of detail, it will be singular if, by mutual forbearance, proper harmony cannot be restored. It is no use harping on the point now; the past is gone, and can never be brought back. The old condition of things, even if desirable, cannot be reinstated.

It is understood that a member proposes to evade the difficulty of electing a new executive by requesting the late President and Council to return to their offices and to conduct the business of the Society until next year, and then, by the new laws to be in the interval made, the members collectively can elect an executive according to the new *régime*. The intention here is good, but it is weak and impracticable; no useful purpose could be served by its discussion. The old Council definitely and premeditatedly resigned, and the bulk of them personally left during the meeting. The rest of the members, though taken by surprise, by a distinct vote accepted the resignation. It would not be a gracious act, under these circumstances, to ask the old members of the Council to come back to carry on the Society and keep the seats warm while the machinery is being arranged to elect their successors; neither is it probable that they would or could accept such a thankless task. Hence the utility of discussing a topic that can be satisfactory to neither party. An executive must, however, be formed or the Society cannot go on. It may be formed out of the members of either of the two sections; and if the other section do not actively oppose the Society can be safely conducted through the crisis. But if either party keep up their hostility there cannot be any effective executive.

The late members of the Council challenged the appeal to the members at the last meeting, and had the verdict gone in their favour they would certainly have been content, and would with propriety have designated the minority as malcontents if they had rebelled against the decision. How can the late officers now do otherwise than respect the issue they invited? The requisitionists, as a section, are dissolved, and exist now only in their positions as private members; cannot the other section also resolve themselves into their original elements as private members too, and in that honourable capacity unite to promote the good of the Society? Cannot some common ground be found on which, as representatives, not of any section, but only of the good of the Society, the chief members can assemble? No useful purpose can be served by carrying the contest further; for, if continued, much bad feeling will be generated, where none was intended, by rancorously dwelling upon a disagreeable topic.

If the acrimony be continued, it can only be on the degrading basis of personal offensiveness. In certain quarters there seems an anxious desire to drive it into this irreconcilable condition. We have struggled hard to prevent the differences assuming this complexion. We have consistently maintained that it was only a question of government, not personality, that has caused dissatisfaction. It is the old system, and not the individuals who were the occupants of office, that we have condemned. We shall not change our ground willingly, but there are bounds to even a peaceful course. Unfortunately it is not always those who are the first to assail who are the most without fault; and photographers should not be the last to remember that "those who live in glass houses should not throw stones."

In the last number of the *Journal of the Photographic Society* the late members of the Council had the opportunity of giving their version of the causes which led to their resignation, and their case was certainly stated with all the bias of partisanship. The members of the new Council have just issued another number of the above journal earlier than usual, so that the members may be cognisant of the other version. This is given in a much more temperate style than the opposition one, and it certainly loses none of its force by its more dispassionate tone. We gather from the article that the present members of the Council have no intention of carrying on the Society without the necessary number of their coadjutors. They will, therefore, ask the members at the meeting on Tuesday next to elect gentlemen to fill the vacancies. If the elected ones are such as they feel they can harmoniously act with they will cheerfully work to pull the Society through until the new constitution is agreed upon. If they cannot so act they will, when the other members of the Council are secure in their seats, ask the members to relieve them of their offices, as they feel that unless there be concord in the Council the affairs of the Society cannot be advantageously conducted. From this it will be seen that those now in power have no desire to retain it, but hold it only at the will of the members. At the same time they have no desire to shirk their responsibilities. They feel, however, that the Council is not the place to fight the battles of the Society in. We are aware of no preconcerted arrangements to secure the election of any set of persons, and, for aught we know to the contrary, whatever is done will be by the spontaneous act of the meeting. Perhaps there may, however, be another *coup d'état* meditated. We shall see.

A report of the committee for revising the laws of the Photographic Society is being published. It comprises a complete code of rules, and, in its comprehensiveness, contrasts advantageously with the old laws, which are so extremely defective and ambiguous. The whole subject will receive consideration at the next meeting. The new rules appear to be conceived in the most liberal spirit. The right of nomination and voting for all officers is placed equally in the hands of all members, whether resident in London or not. The President, Treasurer, and Secretaries (for *two* secretaries are proposed) are to be annually elected by the members, and to be eligible for immediate re-election. The three Vice-Presidents and eighteen other members of Council are proposed to be elected for three years, one-third to retire annually by seniority, and not be eligible for re-election until after the lapse of one year. The object of this is to prevent the management drifting into the hands of one set of members, and to arrange for the introduction of new blood and more frequent distribution of the honours and responsibilities of office than has hitherto been the case. Blank papers for nomination are to be supplied to all members, and balloting papers, containing the list of the persons nominated, are to be furnished to every member, so that he can vote without being present, and yet preserve the secresy of the ballot. Provision is made for the full discussion of all subjects at special and general meetings without the quibbling restrictions which have recently prevailed. Committees are to be appointed annually for special branches of investigation, which it is hoped will remove the stigma that the Society exercises no influence on the improvement of photography. Exhibitions are to be held and medals awarded "for photographs of high order of merit, and for meritorious inventions and improvements." The awarding of these medals is to be entrusted to a jury of gentlemen who are not competitors themselves, but who are to be elected by the members at the meeting immediately preceding each exhibition. This rule, while it permits the officers of the Society to compete, removes from them the invidious duty of selecting the jury. If the selection of this jury were to devolve on the Council, the members of the Council would be either debarred from competing or open to the charge of appointing their own judges. This would be unjust, because the Council will always embrace gentlemen who will form the very class that constitutes competitors. There is a final enacting clause which says that the rules shall only be binding when they are approved by a majority of the members voting personally and by voting papers. We commend the new constitution to the careful consideration of the members. They seem to have been very carefully thought over, and appear to have been drawn out to meet every emergency of a Society with members so scattered as this one. We are certain that the present troubles never could have arisen if these laws had been in existance six months since.

Now that probably the longest and most costly trial which has ever been brought before a court of law has virtually come to an end (for the threat of an application for a new trial conjures up a spectre too ghastly to contemplate, unless it be decided to fit up the new Palace of Justice with the most approved appliances to be found in our lunatic asylums), we may be permitted, before interest in the subject entirely dies away, to place upon record the important part played by photography in the great drama by the reproduction of the many and various documents desired by both sides, independently of the aid which it afforded in identifying one of the most notable of the witnesses produced in the case. Letters from the undoubted Roger Tichborne have been by this means placed side by side with those of the claimant—not for a mere momentary comparison, as is usually the case when documents are produced in evidence, but enabling every one of the jury, and also the judges and counsel engaged, to note each point and each letter as the comprehensive and analytical summing up of the Lord Chief Justice proceeded, as well or better than could have been done had they been obliged to look over the shoulder of Sir Alexander Cockburn at the original lying upon his desk. The orthography, the peculiarity of each letter—almost every one of which seems to have had its own special formation—all this could never have been attempted had it not been for the art of photography; and though some strong remarks had to be made in the course of the trial upon a supposed "made-up" photograph, the bottom of which does not seem to have been thoroughly sounded, the aid rendered to the course of justice by our art can never be over-estimated.

In his eulogistic remarks on the portrait of M. Davanne, which has been printed from a plate engraved by MM. Goupil, of Paris, and in describing it in his letter in the present number as an illustration of M. Rousselon's process of photo-engraving, Mr. Sutton unwittingly and, we know, quite unintentionally detracts somewhat from the merits due to the real inventor of the process by attributing it to another person. The Rousselon process is, in reality, that of Mr. Woodbury, who, when he first published it, did not do so as a mere suggestion, but gave it with all the completeness of detail which was necessary to enable him to secure a patent for it—a patent which is now in force in this country as well as on the continent. The process referred to is not the ordinary Woodbury printing process now so well known, but is a method for engraving a metallic plate from which, by the ordinary copperplate method of printing, impressions are obtained in printers' ink. We here give an outline of the process by which plates may be engraved with all the delicacy of a silver print, yet possessing all the force of a bold mezzotint. Let us suppose that the portrait of M. Davanne, already referred to, is the subject to be engraved. The first thing to be done is to prepare a sensitive gelatine pellicle, the same as for an ordinary Woodburytype, but with this difference—that the gelatinous film shall be charged with a fine powder such as that of emery. When the film is exposed and developed, and a "relief" has been obtained, the granular image is forced by hydraulic pressure into a plate of metal, which is now impressed with the portrait in a grain similar to that possessed by a mezzotint copperplate. In giving details of his method of making a granular "relief" Mr. Woodbury says:—"This I accomplish by mixing with the gelatine and bichromate (instead of colour in a fine state of subdivision as used in the carbon process) a coarse granular substance or powder of the same description, that is to say, a granular substance or powder that will take the place of the colour as now used to prevent too deep an action of light into the bichromatised gelatine; this when acted upon by light transmitted through the negative will produce a relief having a granular surface and possessing the necessary qualities for producing an ink-holding ground. In some cases I partially dry the gelatine relief and dust over it a coarse powder such as emery, which while the relief is in a semi-dried state will adhere only to the parts representing the dark portions of the design, and will consequently give to the soft metal plate produced by pressure therefrom a corresponding granular effect, which is usually wanting in such plates as now prepared, but which is necessary to a successful result when printing with the fatty opaque ink. Or I give the plate two coatings of the granular gelatine mixture, the first holding a finer and the second a coarser powder, the latter after washing holding only the coarser grains, which represent the deeper blacks of the picture." To MM. Goupil great credit is undoubtedly due for the excellent manner in which they have carried out Mr. Woodbury's valuable invention; but to the latter gentleman must be assigned such honour as is connected with that invention.

ON REDUCTION BY LIGHT AS INFLUENCED BY COLOUR.

It is a well-known fact that the facility of reduction exhibited by any substance under the influence of light is largely affected by other substances placed in contact with it. Not only the facility, but the character of the reduction, may be modified, as proved by the various colours of the reduction product. As familiar examples I may mention the various tones which a chloride print shows according to the different metallic chlorides with which the paper has been imbued previous to floating on the silver bath, and the greater or less facility of reduction produced in this way. The sensibility of silver iodide is largely modified by the character of the pyroxyline employed to make the collodion film in which it is enclosed; and the sensibility of a dry bromide film is powerfully increased or diminished by various substances which may be placed in contact with it.

Some months since Dr. Hermann Vogel published some very interesting experiments indicating that the impressibility of silver bromide to the different parts of the spectrum is modified by substances placed in contact with it, according to the following law, viz., that coloured substances (if capable of uniting with bromine) enhanced the sensibility of silver bromide *to those rays which the coloured substance absorbed.* So that a substance absorbing the yellow rays would heighten the sensitiveness of silver bromide to the yellow portion of the spectrum (providing that such yellow substance was capable of uniting with bromine); and that this action was so well marked that a bromide film could be rendered as sensitive to the yellow as to the violet rays.

The question naturally presented itself whether any general law of this kind manifested itself through the various phenomena of reduction by light. Whether, for example, if any readily-deoxidisable substance were exposed to light in company with an oxidisable substance having a well-marked colour, would the reducibility of the first substance be found heightened to particular rays having a definite relation to the colour of the coloured substance? To solve this question I have made a very extended series of experiments, but could not find any support for such a view. No definite law could be found connecting the colour of substances with their influence upon the reduction of reducible compounds by particular rays.

In making the examinations, the results of which are given below, the following method was adopted:—A species of artificial spectrum was prepared out of strips of coloured glass, each strip representing one of the well-marked colours of the spectrum. In part commercial coloured glass was used; but for most of the colours aniline and other transparent pigments were dissolved in bleached lac varnish. The varnish was then flowed over glass, generally on both sides, to obtain full, deep colouration. Out of this glass strips were cut, and were attached, side by side, upon a plate of glass. It was found a great advantage to give these strips a considerable length, so that several bands of prepared papers could be exposed at once. The best dimensions were found to be ten inches in length by five-eighths in width. In the course of the examinations given below over a hundred and seventy of these spectra were printed. Compared with examinations of sensitiveness obtained by the use of a spectrum formed by a prism this method has certain advantages and certain disadvantages. No coloured glass can be obtained that exactly represents the colours of the prismatic spectrum, but a sufficient approach can with ease be had. On the other hand, comparative trials are in this way much more exact. If it be desired, for example, to ascertain the effect of aurine on silver bromide, two pieces of paper containing exactly the same quantity of silver bromide, produced under equal conditions, but the one containing, in addition, aurine, can be exposed side by side, and developed in the same developing bath. A comparison, after fixing and drying, shows with considerable exactness the effect which the aurine or other modifying substance has exerted, perhaps with more exactness than can be easily obtained on bromide films.

Ferric Salts.—Bands of paper were first thoroughly impregnated with various colouring matters—aurine, aniline blue, aniline green, and cold infusion of carthamus, which last gives a strong yellow colouration, and is easily oxidisable. These were then imbued with solution of ferric ammonia oxalate, and exposed alongside of other bands prepared with the ferric salt only. Three repetitions of the experiment gave the same result. No colour heightened the sensitiveness to any particular ray. Carthamus increased it to the whole spectrum considerably; aurine strongly diminished the sensitiveness to the whole spectrum; aniline green slightly diminished it; aniline blue produced no visible effect; but in all cases the modifications produced affected the whole range of colours, and showed no discrimination.

The direct effect of light upon the ammonio-ferric oxalate is but faintly visible, but is rendered strong and permanent by plunging the exposed papers into a bath of potassium ferridcyanide, which brings out a deep blue image.

Potassium Bichromate.—With this substance no after treatment is necessary, the reduction caused by light appearing at once.

Aniline blue and green seemed to produce very little effect, and what was produced extended over the whole spectrum alike. *Aurine* appeared to exert a specific influence on the yellow rays, which impressed themselves less strongly than on the plain bichromate paper. On either side of the yellow no difference of effect was noticeable.

Potassium Ferridcyanide.—This substance exposed to light affords an image which is greatly strengthened by subsequent treatment with a ferric salt. Ammonia ferric oxalate proved to answer best for this purpose. Iron ammonia alum, which was also tried, has an injurious effect upon the aniline and other colours, darkening them and setting them so that they cannot be removed, and thus obscuring the result.

The removal of the aniline colours after exposure was always a troublesome matter, so strongly do they adhere, and as long as any strong colouration remains in the paper it is difficult to estimate the effect produced by light. Repeated washings with alcohol were used, and in those cases in which it could be done without affecting the image liquid ammonia was advantageously added.

Rosaniline, aniline green, mauvine, coralline, aurine, and aniline blue were tried. All of these, without exception, diminished the sensitiveness to the whole spectrum, but diminished it in about the same proportion throughout, and without discrimination as respects particular colours.

The reduction of sensitiveness was in the order given above, rosaniline and aniline green producing scarcely any effect, the two next much more, the two last yet more.

The final image obtained with potassium ferridcyanide does not depend wholly on the substances with which it is in contact, but to some extent on the mode in which the image is made visible. We may either obtain, as above, a blue image, or, by substituting uranic nitrate for the ferric salt, we get a brown-red image.

When this uranic treatment was used a somewhat, but not very materially, different result was obtained. All the colouring matters tried diminished the sensitiveness of the paper to the more refrangible rays to about the same extent. At the other end of the spectrum two colouring matters, aniline blue and coralline, diminished the sensitiveness more than did the rest of the colouring matters.

Ferridcyanide and Ferric Salt Together.—When potassium ferridcyanide and ammonio-ferric oxalate are mixed, and paper imbued with the mixture is exposed to light, a lavender-coloured image is obtained, which, by simple immersion in water, passes to a rich blue.

With this paper were tried the six colours already enumerated, not one of which heightened the sensitiveness of the paper to any ray of the spectrum. With coralline, aurine, and blue there was a diminution of sensitiveness to all the rays equally. With rosaniline and mauvine scarcely any effect was perceptible. The aniline green diminished the sensitiveness to the less refrangible end rather more than to the other.

Uranic Nitrate.—The effect of light on uranic nitrate is brought out by plunging into a bath of alkaline ferridcyanide.

Red and orange rays: All the colouring matters except mauvine produced a diminished sensitiveness to these rays.

Yellow: All except rosaniline diminished sensitiveness.

Green and blue: All colouring matters lowered the sensitiveness to these rays.

Violet: All colouring matters except mauvine diminished sensitiveness to the violet rays.

Silver Chloride.—With direct printing on silver chloride in contact with excess of silver nitrate mauvine and aniline green were without effect. Aurine diminished the sensitiveness to all the rays. Aniline blue diminished the sensitiveness to green, increased it to yellow, and was without effect on the rest.

The most curious result obtained was the diversity of effect produced by three red colours tried:—

Rosaniline produced greater sensitiveness to blue and violet, diminishing all the rest.

Coralline increased the sensitiveness to blue and violet still more than rosaniline, but, instead of diminishing sensitiveness to the other rays, increased it.

Litmus reddened by acetic acid acted much like rosaniline.

Therefore, in the case of rosaniline and litmus, we have some approach to Dr. Vogel's law; but coralline, on the other hand, contradicts it, heightening, as it does, the sensitiveness to all the rays, as well those that it absorbs as those which it radiates.

Silver Iodide.—With silver iodide and bromide, instead of a direct action by light to its full extent we have to do with a faint impression followed by a development. As in these investigations paper was used as the support for the haloids gallic acid with silver nitrate and acetic acid, sometimes with, sometimes without, the addition of a lead salt, was used.

To *violet rays* (and also to white light) two of the three red colours used gave no additional sensitiveness. Here is a remarkable diversity from the effect produced in the case of silver chloride, with which the red colours gave an increased action at the more refrangible end of the spectrum. The three red colours were coralline, rosaniline, and aniline. Of these the first slightly inceased the sensitiveness to the violet; the other two diminished it.

With the *blue and green rays* aniline green imparted the most sensitiveness, aniline blue gave a slight increase, and aurine and rosaniline diminished the sensitiveness, especially with the green ray.

With the *yellow rays* a slight increase of sensitiveness was obtained with aniline blue and green; whereas coralline diminished the sensitiveness a little, aurine and rosaniline a good deal.

Silver Bromide.—As silver bromide is the most important of the substances examined—indeed, the most important of all known sensitive compounds—I have classified the substances tried in connection with it in two columns, in the order of the sensitiveness conferred upon the two ends of the spectrum.

Philadelphia, February 6, 1874. M. Carey Lea.

(To be concluded in our next.)

GLYCOCINE *VERSUS* GELATINE.

I think Mr. Kennett, in your last number, hardly distinguishes sufficiently between glycocine and gelatine. It is the former I recommend for use in the developer, and I think it of great value.

Indeed in my process, where I use a developing preservative, I find it of great use, and in this manner was able, two or three days ago, to take an instantaneous picture of a dog at three in the afternoon—no easy matter at this time of year.

H. Stuart Wortley.

PRINTING, TONING, AND FINISHING.*

Having stated my method of silvering the paper, I will now give my treatment of the gold, which I find to be well adapted to the printing process.

Toning Bath—Stock Solution.

Chloride of gold	30 grains.
Acetate of sodium	30 „
Water	30 ounces.

With my prints I find no difficulty in using it immediately, but prefer not to use it until a few hours after making.

When required for use I take water sufficient to contain the prints made from four sheets of paper, and to this I add one ounce of the stock solution. This is sufficient to tone four sheets. It will be observed that the stock solution contains one grain of gold for each ounce of water. It follows, then, that one grain of chloride of gold will tone four sheets of paper. This may be considered too much paper for the amount of gold, seeing that the usual direction prescribes a grain of gold for each sheet. Dr. Vogel, referring to this subject (see *Handbook*, page 139), says—"We have to calculate 0·06 gramme equal to one grain of gold for every sheet of paper;" whereas my regular practice is to tone the number of sheets stated, and I have frequently, for experiment, put as many as seven sheets at once into the bath with only one grain of gold, and have succeeded in toning the whole quantity well and thoroughly.

There are three things to notice in relation to this method of procedure:—

1. There is no alkali added to this toning bath at any time.
2. Nothing different from the stock solution is added to the toning bath when used to cause precipitation of gold.
3. Placing the whole number of prints to be toned by a given quantity of gold in the solution at once ensures more complete utilisation and equalisation of the toning agent through the entire number of prints. The large surface exposed to the action of the toning bath at once prevents rapid reduction, and, there being in the bath nothing but the prints to precipitate the gold, the toning takes place with deliberation and uniformity.

The *rationale* of this process is as follows:—The chloride of gold usually containing a small portion of hydrochloric acid part of the acetate of sodium is decomposed, the acetic acid being displaced by the stronger acid, and chloride of sodium formed; thus, $HCl + NaC_2H_3O_2 = NaCl + HC_2H_3O_2$. So the solution then consists of chloride of gold, chloride of sodium, acetate of sodium, and acetic acid. The chloride of gold should contain but a small portion of acid, and then there will be but little acetic acid formed, which does not interfere with the toning.

In the number of The British Journal of Photography for Feb. 14, 1873, Mr. Sutton condemns the use of the acetate of soda in the gold bath, arguing that it may conduce to the fading of the prints. He says:—"When the print is put into the gold bath there is generally a little free nitrate left in it. This will be converted by the excess of the acetate of soda into acetate of silver, which is insoluble and remains in the paper until it is put into the hyposulphite. The acetic acid is then set free, and will occasion the liberation of sulphur, which will cause the prints to fade. * * * The same reasoning will apply to the phosphate, borate, tungstate, &c., gold baths. The use of all these salts I regard as a great mistake, and very foolish."

Notwithstanding this strong denunciation of these favourite salts, I like the acetate so well that I am unwilling to discontinue its use without examining the cause of alarm a little further.

Is there any such danger as claimed by Mr. Sutton? We will waive the charge of foolishness for the present. If the former does not exist the latter may be difficult to sustain.

First: he claims that "when the print is put into the gold bath there is generally a little free nitrate left in it." I believe the usual practice is to wash the prints in several changes of water, and finally in a dilute solution of common salt, to ensure the removal of the last trace of the free nitrate. From the salt water they are removed before toning to another vessel containing an abundance of water. It is not evident that after this treatment there is any free nitrate left. If there be, the test, which is present in sufficient quantity (namely, the chloride of sodium removed with the prints from the salting solution), should show its presence. Now, it is certainly advisable to remove from the prints all the free nitrate before toning. Nitrate of silver is not wanted in the toning bath. If salting the prints will accomplish the object it cannot be too strongly recommended.

But suppose the salting is omitted, and that a little free nitrate remains after washing, as it surely will in this case, then it must be in a very dilute solution. Such a solution of nitrate of silver will not decompose the acetate of sodium. This can be shown by experiment. Dissolve ten grains of acetate of sodium in one drachm of water in a test-tube; into another test-tube, containing half-a-drachm of water, add two or three drops of a twenty-grain solution of nitrate of silver, and pour a part or the whole into the acetate. No acetate of silver is formed. Therefore it is not probable that a little free nitrate—that is, such a quantity as is generally left in the prints when put into the gold bath—would be converted into the acetate of silver.

But it is not in the gold bath that the mischief is done with which the acetate of sodium is charged. The cause originates in the gold bath; the evil is accomplished in the hyposulphite—that is, supposing acetate of silver to be formed in the toning bath, and carried in the prints into the hyposulphite bath, "then the acetic acid is set free, and will occasion the liberation of sulphur," &c. If this be true it can be easily shown by experiment. Into a test-tube, containing one drachm of the acetate solution used in the former experiment, add a few drops of a twenty-grain solution of nitrate of silver. Acetate of silver will be formed, as may be readily seen. Now add this to a solution of hyposulphite of the strength usually employed for fixing. It very soon disappears, leaving the solution as clear as before; nor will the solution, on standing, exhibit any turbidity to indicate the liberation of sulphur. And this is what might be expected from the fact that the acetate of silver is a monobasic salt like the chloride of silver, and therefore from analogy it might be anticipated that the reaction in the hyposulphite would be similar. The following equation represents what takes place:—$AgC_2H_3O_2 + Na_2S_2H_2O_4 = NaC_2H_3O_2 + NaAgS_2H_2O_4$. Acetate of silver added to hyposulphite of sodium is converted by double decomposition into acetate of sodium and the double hyposulphite of sodium and silver, both of which are soluble. If the "liberation of sulphur" did take place it would be indicated by the milky appearance of the liquid and the odour of sulphurous acid.

I have thus endeavoured to give a full answer to Mr. Sutton's objection to the use of the acetate of sodium in the toning bath, not only on account of the high authority which pertains to that gentleman's writings, but also because a principle is involved which carries, with the acetate, nearly all the other salts commonly used for neutralising the acid of the gold salt, and that, too, by many of the best photographers in this or any other country. According to my practice, as before stated, all the trouble required in the use of the acetate bath is the preparation of the stock solution. This remains slightly acid, consequently there is no precipitation of gold. It is added in such quantities and at such times as required, whereas, in the use of the carbonate so strongly recommended by Mr. Sutton, whenever the gold is added carbonate of soda should also be added. I have never been able to tone as many prints with a given quantity of gold with the carbonate as with the acetate, the reason of which may be that when the carbonate is used all the gold is precipitated; but when the acetate is used a portion of that not utilised, although incapable of commencing the toning action, may yet aid the fresh chloride to do more work than it otherwise would.

I will now close my remarks upon the subjects under discussion, leaving the consideration of the remaining subjects pertaining to the photographic print to others.

W. H. Sherman.

* Concluded from page 78.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The greatest novelty of the past month is, without doubt, the production of photographs in relief. Having seen some specimens of this new class of artistic work I can fully confirm all that has been said about the wonderful effect obtained. Photographers, however, had better at once dismiss any idea they may have formed respecting the process, whatever it is, being one that can be worked by any person, even if that person possess a high degree of art-culture and taste; for, so far as I can perceive, the process will remain in the hands of the sculptor, the peculiar skill displayed in the finishing of these pictures being possessed only by sculptors. How are they done? Various modes may be surmised. In the first place, the photograph may be laid down upon a flat slab of plaster or clay and the outline and details traced so as to set-off upon the clay, which can then be built up to have in appearance a general approximation to the effect ultimately desired to be secured. From this can be obtained a counter cast, and if the photograph be previously moistened a very high degree of relief may be conferred upon it by subjecting it to pressure between these two solid bodies. Relief may also be obtained by placing the photograph against a strong light and tracing the outlines on the back of the print, then, by laying it face down upon a waxy, saponaceous, or stiffly-yielding material, and applying pressure from behind, any details may be forced up in relief. If the photograph be taken on thin, non-albumenised paper no tracing on the back will be required, as in most cases the details can be seen with comparative ease. But there are numerous ways by which a temporary degree of transparency may be imparted to a photograph, and by the aid of which it can be seen nearly as well from behind as in front. The final finishing must be done on the picture side, and the degree of minute detail which may then be given is wonderful. I have succeeded in securing such perfect relief in the jewellery in a lady's portrait on which I was making some experiments as to show every curve and filament of the brooch and earrings in nearly as sharp relief as if it were cut by a graver.

If one may judge by the criticisms of the newspaper press Mr. Vernon Heath's lectures on autotype processes at the Royal Institution the production of large landscape photographs from small ones is likely to come into great favour with the public. By the method of proceeding illustrated and described two serious drawbacks are overcome. The average class of photographs—however beautiful they may be, and however well calculated to bear minute inspection—are rather too small for framing to adorn the walls of a lofty room; but by enlarging a 12 × 10 picture only three diameters—an amount of amplification that almost every photograph will bear—we have it at once brought up to the very respectable dimensions of 36 × 30 inches, or even larger if desired. Again: by printing in carbon one secures the inestimable boon of permanence, even although the picture may unfortunately happen to have been suspended upon a damp wall—a condition which is usually fatal to the very existence of a silver print. I know that it goes against the grain of many an honest photographer to charge the high price for a large silver picture which he is compelled to do, on account of the possibility of his work, after the lapse of a few years, being brought back to him in a guise very different from that in which it originally left his studio. Silver prints, like sins and chickens, often "come home to roost." Public attention is being seriously directed to the want of permanence in silver prints; and during the past few weeks I have seen prospectuses of photographically-illustrated works in which this is recognised by a definite announcement guaranteeing that the illustrations are printed by one or other of the *permanent* processes, and not by silver printing. This is training public taste and feeling in a wholesome direction.

A capital suggestion was made, and an example set, to members of photographic societies by Mr. J. A. Forrest, of Liverpool, who, at the last meeting of the Liverpool Amateur Photographic Association, presented to that body a pair of Edwards's combination printing-frames for the use of his fellow-members. The value of such presents cannot be over-estimated. There are numerous pieces of apparatus which, from their expensive nature, are not accessible to all amateur photographers; and if by presentation or purchase apparatus of this kind were obtained for the use of the members many would be enabled to prosecute research or secure amusement in a direction from which they are now debarred. Among the apparatus which would come "handy" to many members of a photographic society may be named a magic lantern of the best and most complete kind, fitted with polariscope, microscope, kaleidoscope, and the other appliances which conduce to render a lantern a really complete and desirable instrument. I am reminded by this that, some time ago, there was some talk at the South London Photographic Society respecting a kind of *ne plus ultra* lantern being purchased for the use of the members, but I have not yet heard whether it has been purchased.

(*To be continued in our next.*)

THE AUTOTYPE AND OTHER PHOTOGRAPHIC PROCESSES AND DISCOVERIES.

A Lecture Delivered by Mr. Vernon Heath before the Members of the Royal Institution of Great Britain at the Friday Evening Meeting, February 20.

Photography, young as it is amongst the sciences, and still younger in its alliance with art, has made during the comparatively few years of its existence the most astonishing progress.

In the year 1842 I was working out the marvels of Mr. Fox Talbot's calotype process with something more than merely keen interest, for his discovery was to me an absolute realisation of that which for a long time had been continually the subject of my thoughts. I was accustomed, in the days I refer to, to sketch a great deal out of doors, using for assistance a form of camera-obscura which was then made for that purpose; and, with the image before me, which the lens of my camera formed on its copying screen, how often did I wonder whether, within the wide realms of chemical science, there existed means by which that image could be secured! Day after day I thought and dwelt upon this, as others no doubt had done before, until at last there came one eventful Friday evening. On the 25th January, 1839, I had the privilege to be present in this theatre, and hear, to my intense surprise and gratification, Mr. Faraday announce the two discoveries—the daguerreotype and Mr. Fox Talbot's invention then named by him "photogenic drawing." Mr. Faraday invited his audience to inspect the specimens displayed in the library of this Institution, and I, being one of those who did so, was from that moment in heart and spirit a disciple of the new science—Photography.

Here are the results from some negatives I obtained last summer; but let me for a moment go back to the period I just now referred to and its results. Here are prints from some calotype negatives I obtained during the summer of 1842. Let me show you one of these prints by the side of this (the calotype print was 6 × 4½ inches, the enlarged autotype 48 × 38 inches), in order that, in some measure, you may see the degree of progress that has been made in so short a period as thirty-one years. I am sure that I may be suffered to say that to myself this is a comparison of extremely great interest; though I doubt whether I should have drawn your attention to it but that it enables me, by pointing to the progress it evinces, to say that the advance photography has made in all its branches and applications is just as marked and equally as great. But, successful as it has been, varied as are its uses, it has had to contend with one very serious drawback—the unstable condition of the photograph itself. All photographs by any of the ordinary methods are subject to gradual and spontaneous chemical change, from which arises their want of permanence. This, though, is so well and so generally known that it is unnecessary that I should dwell upon it, beyond saying that as soon as it was recognised it became the end and aim of a large number of patient, earnest workers, in all parts of the world where photography was known, to provide a remedy; and that now, to quote from an article in *The Times* upon this subject, "by the cumulative effect of successive inventions and improvements, means have been found for accomplishing this end."

Of the processes which have had this object in view the autotype is entitled to take very high rank, both for the beauty and completeness of its results. The word "autotype" signifies, as you will have determined, self-printing; and by those who proposed and adopted it it was intended to express the power of producing, independently of any aid or action other than that which belongs to the process, a picture in monochrome, "whether," to use the language of a well-known writer, Mr. Tom Taylor, "it be in red or black chalk, India ink, sepia, common ink; in short, any colouring matter that can be incorporated with gelatine;" and he adds that "as only the pigments which are the most permanent that are known to art are used in the process the finished autotype is as permanent as the pigment which is selected for its production."

In the explanation I am about to give you of autotype printing and productions I will ask permission to pass over a great deal of that which is historical, as well as a great deal of that which is technical.

I must content myself with giving an explanation of its most important principles, and with mentioning merely the names of those whose researches and discoveries have, during the last few years, brought it to its present state of perfection and ease of manipulation. Foremost among these are Mr. Mungo Ponton and M. Poitevin; the late Mr. Blair, of Perth; prominently, Mr. Swan, of Newcastle-on-Tyne; materially and importantly, Mr. Johnson, of the Autotype Fine-Art Company; then Mr. Ernest Edwards and Mr. Window; and last, though very far from least, Mr. J. A. Spencer and Mr. Sawyer, who are now members of a well-known firm engaged in the production of autotype work. For assistance and contributions for this evening I am greatly indebted to several persons; but to Messrs. Spencer, Sawyer, Bird and Co. I am under the greatest obligations, for they have not only supplied me from their factory at Ealing Dean with means and appliances for my lecture, but Mr. Spencer has very kindly given me the aid of his valuable services for my demonstrations.

Gelatine plays a most important part in the autotype and all its kindred processes. The colour of an autotype picture is due alone to the pigment which is used. Here is some gelatine in the state it is before the pigment has been incorporated with it; and here some with which various colours have been mixed—"pigmented gelatine," as it is called. Paper suitable for the purpose is coated on one side with this preparation, and if not needed for immediate use is allowed to dry. Here are a number of sheets which have been so treated. In this state it will keep any reasonable time; light has no action upon it. It may even, without injury, be soaked in cold water and again dried; but if put into warm water the gelatine is dissolved, and the pigment washed away.

To render this preparation photographic—that is, to render it sensitive to the action of light—it has to be immersed for a short time in a solution of bichromate of potash. Here is a sheet which has been so immersed, though in no way that is apparent are certain properties of the original preparation altered; that is, it will keep a reasonable time if not exposed to light, and it is still readily soluble in warm water.

But expose this film of bichromatised gelatine to light and a most important action is set up. Ordinary photography, you know, is based entirely on the property light possesses of acting on nitrate of silver in contact with organic matter, the colour of an ordinary photograph being due to the reduction of the silver, and its subsequent toning with gold. But in the autotype, and all like processes, the photographic action is not so much a colour change as in the silver print, but a change in the character of the bichromatised gelatine of this nature—that which, before exposure to light, was readily soluble, becomes, by exposure to light, insoluble. By the way, it will be convenient now and hereafter to call this compound of gelatine and colour by the name that has been given to it—"tissue." It is unsensitised tissue before immersion in the bichromate, sensitised tissue afterwards.

Suppose, now, we place this card, with the openings I have cut upon it, on a piece of sensitised tissue, and expose them to light in the ordinary printing-frame of the photographer, all those portions of the tissue which can be seen through the openings of the card are, by the action of light, rendered insoluble, while the protected parts remain soluble and can be readily washed away, giving in the end the result I have here. Now, although this illustration answers my immediate purpose, and exhibits the particular change I have referred to, it explains little indeed of the whole change light is able to effect in this sensitised tissue. This, as we go on, we shall see is far more interesting, far more important, and, I may add, far more wonderful. The absolute action of light upon the tissue may be epitomised thus:—The degree of insolubility that is attained, or the degree of solubility that is preserved, is in exact proportion to the degree in which light is shut out from, or let into, the coating of bichromatised gelatine; that is, suppose we intervene between the tissue and the light a means of resistance constructed on an exact scale of gradation of tones running from transparency to opacity, we should translate that resistance into the same exact gradations of the pigment which had been mixed with the gelatine.

[This proposition, involving as it did the most important principles of the process, was fully explained and illustrated by the use of a large diagram, by which the relative degrees of insolubility and solubility were exhibited as the result of the light's action under certain particular circumstances; the diagram being also used for the purpose of showing that where the insoluble film was the thickest there would be the darkest tone of colour, and where it was the thinnest there was the lightest tone, and that between those extremes all the other gradations of tone are formed. A large autotype landscape of the *Vale of Festiniog*, from a negative taken by the lecturer, was referred to as proof of this, the varying planes of distances being rendered in the most perfect way. Mr. Spencer and his assistants then proceeded to develope an autotype print of unusual size, the lecturer again using the diagram for the purpose of explaining why the transfer paper was attached and the original paper support removed. Mr. Spencer succeeded most admirably in the development of the print, the subject of which was *Windsor Castle from the Thames*, the lecturer meanwhile explaining certain points of the manipulation.] Mr. Vernon Heath continued:—

Now, regarding autotype pictures of this character, and of the larger size behind me, since this lecture was announced I have been so frequently asked to explain the special method employed for their production that I am led to think it has sufficient general interest to justify my doing so, especially as my description will be very short. Our illustration here, as well as these and the many other examples which have at different times been exhibited in the library of this Institution, are all enlarged from negatives of this size (12 × 10 inches). The method used is extremely simple, and is itself of much earlier date than the autotype process. I find, from the *Journal of the Photographic Society* of London, that nearly twelve years ago I described, at one of the meetings of the Society, a plan of enlarging which at that time I was using extensively, and which, practically, is identical with that now used for the production of these pictures, with the exceptions that an *autotype transparency* is substituted for a silver-on-collodion one and an *autotype* for the final resulting print in lieu of the usual silver print. The operations are these:—A tissue print is made from and by contact with the negative to be enlarged, and this print, being transferred for its permanent support to clear, transparent glass, is therefore what is termed a "transparency." This tissue transparency, if made from a good negative, is extremely beautiful, and is immeasurably superior to any photographic print that could be obtained from the same negative by ordinary means, and greatly superior to a transparency produced by the old method of silver on collodion. It is really to the perfect character and quality of the autotype transparency that the great success of the enlargements resulting from it are due. The merit of first using a tissue transparency for enlarging is, I believe, due to Mr. Window, of Baker-street.

Suppose the transparency is in all respects satisfactory, it is set up in front of a lens; the size of the resulting negative depending upon the focal length of the lens, and on the distance the transparency, the lens, and the position for the negative are apart. The negative so produced is an ordinary silver-on-collodion one, and to avoid inversion in the resulting autotype print the transparency is put film side outwards. As to magnitude, a negative can be produced of any size within the limits of a camera and its adjuncts. The size of the plates for the negatives from which these pictures are produced are each 48 × 38, and I see no difficulty in obtaining equally perfect results on plates double the size. By the exercise of care and skill in the manipulation there need be no loss of detail or sharpness; whatever in such respects is the condition of the original negative so is the condition of the reproduction, without reference to the amount of enlargement.

Doubtlessly, a great deal is due to the ability and technical knowledge Messrs. Spencer, Sawyer, Bird and Co. have brought to bear in working out the details of the process; but the character and quality of the original negative affects most materially the character and quality of the resulting enlargement. Partly due to the long period over which my own experiments in enlarging processes extend, my landscape negatives are found to possess a distinctive and peculiar fitness for autotype work; but, as this is a matter I could not, nor should not, discuss, I will merely say that, in the event of anyone desiring to see the character of my negatives, I have had four representative specimens put in the library.

I pass now to the concluding branch of my lecture. Thus far my explanations have been limited to considering the autotype process as a substitute for certain of the usual photographic processes; but it has yet another application, the nature of which is such that those who hear of and see it for the first time do so with very great surprise. Poitevin, who was one of the early discoverers of that which resulted in autotype, found that the surface of gelatine rendered insoluble by light acquired the property of repelling water as from a greasy surface, thus enabling a design to be inked with printing-ink and an impression to be taken from the inked surface on to paper—a process analogous to the operation known as lithography. Founded on Poitevin's discovery is that which is now known as the "mechanical autotype printing process," by which, on a plate prepared more or less by the means used for autotype productions as I have explained them, a print from a negative is obtained, and the plate being then placed in a printing-press copies of it can be produced in printers' ink or in any permanent pigment with great rapidity; whilst the proofs themselves, in their delicacy of texture, gradation, and faithful rendering of the minutest detail, leave little to be desired.

The principle upon which this method of printing is based is this:—Avoiding the actual details of the manipulation, a plate, which in this case is a thick piece of finely-ground glass, is coated with a solution of gelatine and bichromate, and, when dry and hard, is exposed under a negative. Much—indeed all—depends upon the proper hardening of the film, the method of accomplishing this being that for which a patent was taken out in October, 1869, now the property of the Autotype Fine-Art Company.

After the exposure under a negative it is washed in *cold*, not hot, water, as in the ordinary autotype process—not with a view to remove any portion of the gelatine, but simply to get rid of the bichromate, and to permit the gelatine to become saturated with moisture, which it will absorb in the inverse ratio of the action of light. This film, after treatment with water, is just in the condition of a moistened lithographic stone. If a roller charged with greasy ink be applied to its surface, the ink will be repelled by the moist portions, but will adhere to the dry or insoluble portions, as it would to the greasy image on the stone. The ink adheres to the image in the exact ratio of its freedom from moisture. An exact transcript of the negative is thus secured in printing-ink on the layer of gelatine, and a sheet of paper being placed upon it, and suitable pressure applied, a print is produced.

By the kindness of Messrs. Spencer, Sawyer, Bird and Co. I am enabled to show you the production of prints by this method. Here, in its place in this printing-press, is a plate upon the surface of which is a result obtained from contact with a negative and exposure to light as in our former illustrations. And now, as Mr. Spencer has been good enough to bring with him one of his skilled assistants, I cannot do better than leave the completion of the demonstration in his hands. The operations are, as you see, strictly analogous to those of lithography. The ink adheres to those portions which refused to take the water, and in exactly the same degree as the repellent action was manifested. Now it is ready for printing; so the paper is carefully placed upon it, and now, proceeding just as does the lithographer, we shall then have our result.

This, then, is the autotype process, divided into its two classes—that which substitutes the ordinary photographic methods, and that which results from the printing-press in a manner analogous to lithography. To summarise: each class possesses great pictorial excellence and beauty, both render, as you have seen, with the utmost delicacy every gradation of tone; and any tint of monochrome possible to the painter can be obtained in their production, and this, too, with a tenure of permanency which may fairly be assumed to be as secure as the Indian-ink drawing, to which experience enables us to assign a stability of at least some centuries.

Before concluding I ought to say that there are several other processes now in extensive use the basis of which is gelatine and bichromate of potass. The heliotype, the Woodbury system, and the various processes which, under Sir Henry James, are in use in the Ordnance Departments—all more or less depend upon the use of gelatine and bichromate of potash. Remembering the position Mr. Fox Talbot holds as the pioneer of the photographic processes in this country, it is due to him to mention that he was amongst the earliest—if not really the earliest—discoverers of the gelatine and bichromate of potash process.

In the library you will find, thanks to my many contributors, several interesting and striking illustrations of the various processes I have spoken of. You will find also special applications of these processes; of these I will particularly mention the beautiful specimens of the Woodbury process, and the marvellous reproductions of the old masters and other subjects of the greatest interest contributed by the Autotype Fine-Art Company.

Here, then, my task finishes—imperfectly and incompletely, I fear. I will, however, permit myself to hope that I may rely, not merely on your generous and liberal interpretation of it, but that I may even consider I have furnished a fairly sufficient answer to the question I hear so often asked—"What is autotype?" and that from what has been said and done tonight, you will be convinced that in autotype we have an additional and important aid to photography, especially as it affects its progress. On this point I think I cannot more appropriately close my lecture than by using the identical words Mr. Faraday spoke from this place on the January Friday evening when he introduced Mr. Fox Talbot's photogenic drawings. Speaking of them, Mr. Faraday said:—"No human hand has hitherto traced such lines as these drawings display; and what man may hereafter do, now that Dame Nature has become his drawing-mistress, it is impossible to predict."

Contemporary Press.

A NEW TEST FOR HYPOSULPHITE OF SODIUM.

[Photographic Mosaics.]

First prepare the following solution:—

Bichloride of mercury	1 ounce.
Chloride of ammonium	175 grains.
Water	8 fluid ounces.

Dissolve, and add one fluid drachm of pure hydrochloric acid.

Now perform the following experiment:—Into a test-tube that will hold five or six fluid drachms put a single drop of a ten-per-cent. solution of hyposulphite of sodium. Fill the tube with water, shake well, pour out the water, and let drip until none of the liquid remains excepting what adheres to the glass; again add one or two drachms of water, shaking as before; to this add a few drops of the mercurial solution, and observe the change of colour which will take place. A slight blue colour or opalescence will make its appearance, due to the minute quantity of hyposulphite remaining after the rinsing above described. Evidently the quantity is very small, and the test must be conducted with nicety. The glass must be scrupulously clean, and the water clear. It is also well to practise the eye by holding another similar vessel containing only clear water beside the one under inspection. One curious in such matters will be tempted to try other experiments. Presuming that the change in the colour of the liquid is owing to the formation of the hyposulphite of mercury, he will be quite apt to try the corrosive sublimate alone. This he would find to be less sensitive. The addition of the sal ammoniac forms the mercuric double salt $HgCl_2 2H_4NCl$, and the hyposulphite converts the mercury into the sulphide.

But what is the use of the hydrochloric acid? *Answer:* If the water used in the experiment happened to contain carbonates (hard water) carbonate of mercury would be formed, and this would produce turbidity similar to the hyposulphite. The acid prevents the formation of the carbonate mentioned, but does not interfere with the formation of the mercuric sulphide.

Having prepared the test solution as above prescribed, and having become accustomed to its most delicate indications, proceed to apply it to practical use in detecting the presence of hyposulphite in the prints as the work of washing progresses. It will be interesting to note the persistence with which this pernicious but indispensable salt maintains its presence in the paper. After washing the prints until the water shows no signs of a remaining trace place a few strips of the paper in a little water, and subject to a gentle heat. This trouble will be repaid by its again manifesting itself to the test.

The less hyposulphite left in the prints the longer they will last. In practice it is never completely removed by washing. The remaining portion is the remote cause of fading. Sooner or later sulphur is liberated, producing the characteristic yellow colour sometimes visible to the naked eye. Oxidation of the sulphur produces an acid, which becomes the immediate cause of fading. Every time the hyposulphite is used another unstable substance is added to the solution, to wit, hyposulphite of silver. This being less stable than the hyposulphite of sodium, the longer this bath is used the worse it becomes. In consequence, the land is filled with fading photographs to the disgrace of the art. W. H. Sherman.

Our Editorial Table.

Illustrations of China and Its People. Vol. III.

By J. Thomson, F.R.G.S.

London: Sampson Low, Marston, Low and Searle.

We have already said, when noticing the previous volumes, this work is profusely illustrated by photographs taken by the author during a long residence in the East. These beautiful pictorial adjuncts are illustrative of Chinese life, character, manners, customs, and scenery, the photographs being printed by the mechanical autotype process of Spencer, Sawyer, Bird and Co.

In his progress through the Celestial Empire Mr. Thomson has been a very keen observer of incident and scenery, and he has evidently used his note-book with as much effect as his camera. The result is a lucid and interesting account, descriptive and critical, of each subject portrayed. When examining the groups the critical eye is arrested by the ease and grace of the posing, for the posed-for-your-portrait appearance unhappily so prevalent in many photographs of the present day is here conspicuous by its absence. One is apt to inquire by what means those whom we are apt to relegate to a lower stage of civilisation than ourselves can arrange themselves, or suffer themselves to be posed, in all the ease and grace of unconstrained and lifelike reality, while such a body of photographic artists as the Solar Club, when being recently photographed by an acknowledged master of the art, assume expressions and attitudes so ludicrously unnatural, stiff, formal, and unmeaning as to engender derisive feelings in the spectator. At first sight it might be imagined that many of these Chinese groups had been taken by an instantaneous process at a time when the subjects of the camera sketch were unconscious of the fact of their actions being perpetuated; but closer attention renders it apparent that the groups are arranged by the artist, and that each particular element composing the whole group must have been tutored for pictorial purposes.

A glance over the pictures inspire us with a respect for some Chinese institutions of which we were not previously possessed. In a view of the interior of one of the workshops of Nanking Arsenal—where large guns are turned, drilled, and rifled—we observe huge turning lathes of the most approved European finish, and of dimensions that one would scarcely expect to see surpassed in our own Woolwich Arsenal. Nanking Arsenal, we are told, is conducted upon the most advanced scientific principles; and in one of the views we see a picture of a mitrailleuse, with all its deadly belongings, together with a torpedo, a howitzer, a rocket tube and stand, a pile of shells, and a field gun carriage.

What we have said respecting Mr. Thomson's marvellous tact in arranging his groups in natural and graceful positions applies in a special manner to his picture entitled *Street Groups, Kiu-Kiang.* In this there are four distinct groups of persons engaged in their ordinary avocations, apparently as unconcerned as if they were totally unaware of the presence of a camera—an instrument in presence of which, as we have said, even clever London photographers appear to lose their presence of mind. Here we find the old letter-writer, fortune-teller, and oculist quite at home in the midst of his work in close proximity to a travelling barber, also professionally occupied; a wood-turner, engaged with a customer who is examining a wooden ladle, and a soup merchant complete the personal elements of an exceedingly clever photograph. It is gratifying to learn that Mr. Thomson has secured many groups of a similar character, which are to be published subsequently. The obtaining of these groups, he tells us, was rendered the more easy in consequence of the representatives of nearly every trade being found in the ordinary thoroughfares of China. One small view of *Kiu-Kiang Wharf* is remarkable for the wonderful distinctness of the details, demonstrating the perfection to which the autotype mechanical printing process has been brought; for, although the heads of some of the figures in the background are no larger than small pinheads, the detail and expression of each face are easily distinguished by the aid of a magnifying glass, and yet, if we are not mistaken, this very picture, small though it be, is an enlargement from one still smaller, teaching in an unmistakable manner the immense importance of taking pictures possessing the greatest possible degree of sharpness.

A series of views depicting phases of life among the celestials, accompanied by a brief description of each, would be a valuable addition to those works, pictorial and literary, which have been prepared for the magic lantern. We are well aware that China is already to be found in the lantern; but such pictures as we have seen were only engravings from what bore the strongest evidence of being fancy sketches. An artist travelling through China can take great liberties with facts, knowing that his artistic veracity is not likely to be called in question. The camera, on the other hand, affords the means of showing us things as they really exist; hence the great educational value of such works as those of Mr. Thomson. We may conclude by adding that the work improves as it progresses, the third volume being in advance of its predecessors.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Tuesday evening, the 24th ult., at the Free Library, William Brown-street,—Mr. P. Mawdsley, President, in the chair.

The minutes of the previous meeting were read and confirmed, and Mr. H. R. Williams was elected a member of the Association.

Mr. O. R. Green said that some time ago he had informed the members of a new process discovered by Mr. W. H. Sherman, of Milwaukie, U.S.A., for rendering silver prints absolutely permanent. The process then was somewhat complicated, but when he (Mr. Green) was on his tour through the United States, last autumn, he had the pleasure of seeing that gentleman at his studio, and of being informed that he had greatly simplified his process; in fact, it was now so simple that it left nothing further to be desired. The greatest credit was due to Mr. Sherman for his successful efforts to render his work permanent. He (Mr. Green) considered it to be the most important discovery made since paper photographs were first used for positives, and he believed that when it came into general use, and the public found the beautiful sun pictures permanent, they would more than ever encourage the art. Double credit was due to Mr. Sherman—first, for his devotedness to the science of his profession and for the application of it, and for his generosity in not patenting his process. He (Mr. Green) added that, as there was a series of articles on printing in The British Journal of Photography,* he feared he should be detracting from them if he were to say more at present, but he advised all persons interested in photography to read the articles in question and use Mr. Sherman's finishing process as soon as it is published. He spoke thus favourably because Mr. Sherman's work was some of the finest he had ever seen.

Mr. H. Houlgrave exhibited about a dozen stereo. negatives taken by Mr. Bolton's "emulsion-without-washing" process. These were of such excellence that Mr. Houlgrave was requested to detail the manner of preparing the emulsion. He (Mr. Houlgrave) said he had not exactly followed the formula published by Mr. Bolton in The British Journal of Photography, but was convinced that the "without-washing" process was a step in advance. He mixed thirty grains of crystallised bromide of cadmium and fifteen grains of pyroxyline with one ounce of ether and one ounce of alcohol, cotton giving a powdery collodion not succeeding like one that gave a tough film. In a level stereo.-developing glass dish he poured one ounce of the above, and, after leaving it for about two hours to set, he filled up the dish with his bath solution of silver, of about seventy grains' strength. After a time he raised the film with a silver fruit knife to allow the solution to flow underneath, and left it to soak a little longer. After pouring off the bath solution he poured on his first washing water, which, from constant use, contained about five grains of silver to the ounce. This was left on the film about half-an-hour, and then saved for future use. The dish was then filled up with rain water, leaving it two or three hours, and washing again until all milkiness had disappeared. After well draining, the film was hung up to dry by artificial heat, as it took too long to dry otherwise. The pellicle was then of a very horny nature, and could be cut and kept till wanted; of course the washing had to be conducted in the dark room. With one ounce of the pellicle he made two ounces of emulsion by adding equal quantities of ether and alcohol, and to that quantity he added forty minims of a sixty-grain tannin solution. When the pellicle dissolved—which took some time unless constantly shaken up—he coated his plates, placing them at once in his drying-box without any further washing, using no substratum. He preferred an edging of india-rubber solution before pouring on the emulsion. In development he first moistened his plates with pure alcohol, washed with water, and then developed with a three-grain solution of pyrogallic acid, adding one drop of a twenty-grain solution of bromide of potassium and one drop of a sixty-grain solution of bicarbonate of ammonia.

* See the concluding article of the series at page 111 in the present number.

In the discussion which followed,

Mr. Wharmby spoke favourably of the process, but thought that by using the bath solution it would get charged with impurities, which it was advisable to avoid, and that Mr. Bolton's method of sensitising was the best one. The complaint of having to use a double quantity of solvents was of little moment, as he could coat a larger number of plates with the new emulsion than he could with the same quantity of the old.

Mr. Atkins said he found the plates were longer under development, and that the film must be moistened with alcohol instead of water.

Mr. Phipps thought that glycerine or saccharine matter would keep the pores of the emulsion open, but

Mr. Wharmby replied that Mr. Bolton had tried these, and found that soap was best.

A unanimous vote of thanks was passed to Mr. Houlgrave for his communication.

The Rev. T. B. Banner said that the time had now come to call the attention of the members to the proceedings of an extraordinary meeting held by the Association in November, 1864. The meeting was called to take such steps as seemed necessary under the circumstances of the sudden and lamentable death of their former secretary, Mr. John Glover, and a subscription was set on foot for the benefit of Mrs. Glover and her children. Mr. Canty (since dead), Mr. Forrest, and himself were appointed trustees, and copies of the proceedings and resolutions were sent to other societies requesting help in the support of the family. The result was that a sum of nearly £300 was subscribed, enabling the trustees to distribute to the family about £32 per year. This fund was now exhausted, but it had lasted nine years, and had been so successful that the children were educated, and were now able to earn their own living.

Mr. J. A. Forrest also remarked on the great help and benefit the fund had been to the family.

The President said it was very gratifying that the Society had been enabled to do good to the widow and family of so deserving a member of their art.

A hearty vote of thanks was passed to the Rev. T. B. Banner and Mr. Forrest for the able and efficient manner in which they had discharged their trust.

Some collodio-bromide dry-plate negatives of Niagara, showing natural clouds, were exhibited. They had been taken by Mr. O. R. Green.

The meeting was shortly afterwards adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on the 19th December last. M. Vogel occupied the chair.

The Chairman opened the proceedings by reading a number of extracts from a work by Herr F. Pecht, called *Art and Art-Industry at the Vienna Exhibition*. From these it appears that the Viennese have but a very low opinion of the artistic capacities of the Berliners, and that altogether they hold them in small esteem as totally wanting in the graces of life. The reading of these extracts were, no doubt, both galling and edifying to the members of the Berlin Society, as Herr Pecht seems to distribute his criticisms with a free hand, and in doing so to ignore many names held dear in North Germany; but we are not so concerned in the reputation of those artists as to deem it necessary to do more than thus merely allude to the subject here.

The Chairman exhibited by means of the sciopticon some views of the Island of Aden, taken during the eclipse expedition of 1868, as well as portraits of the members thereof, and views of the sun during the eclipse.

Herr O. Lindner reported on his experiments in photography by artificial light. He had used Harnecker's enlarging apparatus and a lime-light instead of daylight. So far as enlargements on paper were concerned, for which the apparatus is constructed, his attempts had not been carried far enough to enable him to say whether the results would be successful or not. By the arrangement of the light so as to concentrate it on the image he has, however, taken enlarged negatives up to 12 × 14, from *cartes-de-visite* and suchlike. The exposure varied from eight to twelve minutes, and the resulting picture was about as good as if done in diffused daylight. The grain of the paper appeared neither more nor less pronounced than if it had been produced in the ordinary way.

Herr Prümm said that he had done reproductions in the same way, and had concentrated his light by means of a glass globe filled with water. He used a petroleum lamp and a quick-acting lens, thereby getting pictures in from about eight to ten minutes; but it was only small ones, such as medallions, that he took. The results obtained in this fashion were quite satisfactory; but it was only useful when the weather was too dull for working in the ordinary way.

The meeting was then adjourned.

Correspondence.

M. Rousselon's Process of Photo-Engraving.—An Epidemic amongst Silver Prints.—Gelatine Negatives.—Direct Positives.—M. Davanne's Preliminary Coating.—French Failures with the Emulsion Processes.

The last number of the *Bulletin* of the Photographic Society of France contains two very fine illustrations by M. Rousselon's process of photo-engraving. One of these is a portrait of M. Davanne, Vice-President of the Society; the other is a copy of a highly-ornamented fan. The portrait, which is a most striking likeness of the distinguished French photographic chemist who has contributed so much valuable information on the theory of positive printing, is from a negative by Herr Luckhardt, of Vienna, and is quite a work of art, although entirely untouched and unsophisticated. The lighting and expression are nothing short of perfection, and prove how how much can be accomplished in photographic portraiture, pure and simple, in the hands of a true artist. It reminds one forcibly of a portrait by Titian, and is in the same style; it might, in fact, be a copy of one of that great master's best paintings. There is no vignetting, no affected prettiness, no unmeaning accessories—nothing but the head and shoulders against a plain dark background, in an oblong frame. It is precisely what a portrait ought to be, and what one ought to see much oftener than one does. In the letter from M. Rousselon which accompanied the present of these fine specimens he says:—

"These proofs were obtained from copper plates engraved solely by light. They are entirely untouched, and an indefinite number of impressions can be pulled from them after they have been *aciérées*—that is to say, electrotyped with iron."

The negative of the fan was taken by M. Blaize, of Tours. The proof of this subject is very elaborate and highly successful, all the half-tones and details being beautifully rendered. Neither of these specimens show any grain except under a magnifier, and they have all the beauty of effect of a fine mezzotint or aquatint engraving. Any ordinary photograph upon albumenised paper looks vulgar by the side of them, whilst carbon prints and collotypes fare even worse by the comparison. If we cannot have daguerreotypes, or prints upon glass or enamel, let us have photo-engravings in preference to any other style of printing.

I may remind the reader that this process of M. Rousselon's is a modification of the Woodbury process, which was suggested to him in the first instance by Mr. Woodbury. The hollows in the intaglio mould or plate from which the proofs are pulled are roughened in some way in exact proportion to their depth, or, in other words, to the degree in which light has acted upon the bichromated gelatine film; but the process is a secret. I hardly know whether the method is superior to that of M. Garnier; for when I last visited him he showed me some exquisite proofs by his process, and in particular one of a copy of a painting by Ingres—a most difficult subject, being a nude figure of a nymph at a fountain bearing a pitcher upon her shoulder, and, of course, abounding in beautiful half-tone.

It must be a source of congratulation to all of us that photo-engraving has now arrived at so high a pitch of perfection as to be worthy of the serious attention of MM. Goupil—the first firm in Europe for copperplate engraving—as a branch of their business. This puts the last and the highest finishing touch to the problem of printing from a negative.

Turning from these beautiful specimens to the unfortunate subject of silver printing, where every now and then some new trouble crops up, we find that at the last meeting of the Photographic Society of France, held on the 6th instant, a discussion was raised respecting what has been called an epidemic amongst silver prints, which manifests itself in the occurrence of yellow spots in the proof. MM. Rohaut and Hutinet related the following singular anecdote:—A photographer of Montereau, M. Massoule, having observed these yellow spots upon some of his mounted prints, sent to the above-named gentlemen some of the same Bristol board that he was using, and some unmounted prints for them to experiment with. These prints were mounted by them, and no yellow spots appeared; but on returning them to M. Massoule the epidemic at once made its appearance. The conclusion seems to be that particular localities are specially subject to it, and that it proceeds from germs in the atmosphere whose operations are favoured by damp; in fact, a sort of putrefactive fermentation appears to be set up by these animated cells in certain little lumps where the sizing of the paper has accumulated, and from which, possibly, the hyposulphite may not have been completely removed. M. Franck de Villecholle observed that when a pile of unmounted prints is put away damp yellow spots frequently come in them; and also in prints which are stored in a room the tiled floor of which is frequently washed.

I may here mention that, last year, M. Chardon sent me a beautiful negative by the bromide process with the bath, which he had transferred to gelatine, and which has now become entirely mouldy and destroyed by the dampness of the atmosphere. I am afraid that this sort of experience will be common enough one day, if the gelatino-bromide process of taking negatives should ever come into fashion. Extreme dryness will, no doubt, be an essential condition of the safe preservation of such perishable products. How will such negatives stand even the moisture of the printing pads, aided by the heat of the glass plate, and the fumes of the nitric acid set free from the sensitive paper during the exposure to light?

At the same meeting M. Grand, of Briançon, proposed a process for obtaining a negative direct from a negative in order that the former may be reversed. His method consists in printing upon a dry bromide plate, by contact; then developing the image with pyrogallic acid and silver; and then converting this positive impression into a negative by treating it with nitric acid. The Secretary remarked that Mr. Sutton had already described a similar process—which was true enough; but my process will answer, as I have proved a hundred times, whilst M. Grand's will not, being founded upon a complete misconception of the whole thing. If you develope an image, as he proposes, by pyrogallic acid and silver, you merely precipitate silver from the developer upon the latent image, which silver, when dissolved away by nitric acid, leaves the bromide film to all appearance as it was before development; but if you follow my plan—or rather Major Russell's, for I was not the discoverer of it—and develope by the alkaline method, you reduce the bromide film itself, and then the treatment with nitric acid converts it into a positive transparency.

M. Davanne recommends the following preliminary coating for dry plates:—Beat up together thirty cubic centimetres of albumen and 250 of water. Add to the filtered liquid fifteen to twenty cubic cents. of ammonia. Pour this mixture upon the dry plate in the same way as collodion; it will flow very easily. Taupenôt plates, he informs us, never blister when this coating is applied to them. He finds that when the albumen is too much diluted blisters occur.

French photographers do not seem to succeed with any of the collodio-bromide emulsion processes. The plates are either slow and give hard negatives, or they are rapid but will not intensify. M. Chardon finds emulsion plates, to be good, very much slower than those which are prepared in a bath; and he knows of no one who has yet succeeded with Colonel Stuart Wortley's published formula. Thus, he says, that although emulsion plates are more easily prepared than bath ones, yet the inferiority of the result is more than a counterbalance. He has not succeeded at all with some emulsion which Mr. Stillman left for trial at a former meeting of the Society. It is very slow, and the film does not stick to the glass. M. Ferrier tried the same emulsion and found the plates pretty good but slow, requiring double the exposure of Taupenôt plates. Mr. Stebbing's plates, advertised as collodio-bromide, are highly spoken of, but they are, I am perfectly sure, nothing but common bromo-iodised plates, no doubt very well prepared, and developed always with pyrogallic acid and silver. They are not quick, and give very brilliant and rather hard negatives. The films are particularly safe and never blister.

Although I sometimes have a little fling at emulsions in my humble way, yet I must confess that two or three of my best negatives have been taken upon Mr. Mawdsley's plates. At the same time, I have some other negatives upon his plates which are too hard to be good, and others too soft and flat. Even in his hands there seems to be a little want of certainty in the process when he aims at a higher degree of rapidity than usual. As for the remarks made the other day by M. Ferrier respecting his plates, I was amazed, and could not understand them at all, for the Liverpool films are now, mechanically, little short of perfection and singularly free from dust specks.

At the same meeting some aplanatic lenses by M. Derogy were exhibited, as well as some proofs taken with them.

A large number of prints in printing-ink were exhibited by MM. Thiel, Geymet, Chardon, and Fortier.

M. Jeanrenaud observed that German collotypic prints must absolutely be varnished, as they peel off the paper with the slightest touch.

Redon, February 27, 1874. THOMAS SUTTON, B.A.

THE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I have to thank Canon Beechey for his able letter in support of my proposal to establish a national society. I still think it would be a good way out of all our difficulties—difficulties which appear to be increasing rather than diminishing.

After having done all I could to lead matters into such a channel as to compel the resignation of the old Council, I was entirely unprepared for the action of the requisitionists in rejecting by sixteen votes to thirteen my proposal to ask the old Council to retain office till their successors were appointed.

It appears to be admitted by very many members of the Society that there were men on the old Council who were neither useful nor ornamental, and whom, in fact, it was very desirable to dismiss from it. There was only one way of doing this, viz., to obtain the resignation of the whole Council, and then at once to re-elect (by means of the six members placed on the Council by the requisitionists) all the good men who were on the old Council, leaving the bad ones out. But very unluckily (as I think) this course did not please the requisitionists, and I find myself now in opposition to them. I still think all that is possible ought to be done to secure the services of such men as Glaisher, Bedford, England, Blanchard, and Abney to photography, in connection with its leading Society.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove-end Road, N. W., March 2, 1874.

[We are glad that Colonel Wortley has now made his position clear. How far others may agree with him is another matter, but we doubted whether his actions were as clear to other persons as they were to himself. As to his scheme for a National Society, we still think the present moment not happily selected. Events must be more settled in the London Photographic Society before it can be seriously entertained. We entirely agree with Colonel Wortley when he says that there were members of the late Council who were neither useful nor ornamental, and therefore whose loss is the Society's gain. And we hope that before long we shall see all the really good men of the old Council reinstated in office.—EDS.]

To the EDITORS.

GENTLEMEN,—Mr. R. W. Thomas should not have told the story of his curious proposition to the committee for the revision of the laws. He came to our first meeting, and after a long talk about conciliation, &c., proposed as the condition of his co-operation that we should agree to do nothing, but, instead of accomplishing the work given us by the Society—making a draft for the Society to act on—to disperse and wait for some unknown and, for aught we knew, impossible scheme of reconciliation of a dispute which had nothing to do with our committee, on consenting to which he would remain a member, otherwise he would withdraw! It was impossible to treat seriously any such proposition, and we could not repress our surprise that a man of Mr. Thomas's good sense should have made it.—I am, yours, &c., W. J. STILLMAN.

8, *Altenburg-gardens, Clapham Common, London, S. W., March* 4, 1874.

SUPPLEMENTARY EXPOSURES THROUGH OPAL GLASS.

To the EDITORS.

GENTLEMEN,—Please permit me to correct an inaccuracy in your number for February 20 referring to the opal glass accelerator exhibited by me at the South London Photographic Society.

Not a syllable fell from me claiming any invention or right in it. The principle is well known, and has been for years. I simply showed a convenient form in which we use it daily in business. Very great interest was shown in it by the company.

I perceived my old friend, Mr. Foxlee, looked upon it as an intrusion into his preserves; but, as opal glass is found far superior to green glass, I see no reason why the simple arrangement for making one opal cap fit a number of lenses should have been withheld.

Finally: please allow me to say that I am perfectly cognisant of what has been written on the matter in American, German, French, and English journals.—I am, yours, &c., SAMUEL FRY.

February 26, 1874.

[We find no imputation made by Mr. Foxlee that Mr. Fry claimed as a novelty the use of opal glass in the cap of the lens; nor was it at all likely that Mr. Fry would have done so, for, as a reader of home and foreign photographic journals, he was doubtless quite well aware of the fact that a lens cap fitted with opal glass, and similar to the one exhibited by him at the meeting in question, had been submitted to and described before the Photographic Society of France at their meeting held on the 9th of January last—a report of which appeared in this Journal of the 6th ult., being a week before the meeting at which Mr. Fry exhibited his arrangement.—EDS.]

GELATINO-BROMIDE.

To the EDITORS.

GENTLEMEN,—From the many inquiries I am constantly receiving for information as to the *modus operandi* employed in producing the transparencies to be seen at your office, as I really have not time to answer all letters sent me on this and sundry other matters connected with the sensitised pellicle, and as my answers will equally affect all who are using gelatino films, perhaps you will insert, for the good of all, the following:—

In the first place, the transparencies in your possession were all produced by contact; the exposure from one to three seconds by daylight, or from five to ten seconds by a gas flame. The time will, of course, entirely depend on the amount of light and the density of the negative. In all cases the exposure should be as short as possible, or the results will not be so satisfactory; and from a plate I exposed yesterday I find the light is greatly increasing in strength, the exposure I gave being one second, or as quickly as I could, and that was quite as long to obtain as good result as it would admit of. The development is the same as my instructions for any kind of plate, with a little more intensification, as it loses somewhat in the after-process of clearing out, and by which you will find the films on the unacted parts are rendered as clear as the glass itself.

If it be wished to obtain a rich black proceed as follows:—After intensifying to the amount required, drop into a glass measure four or five drops of a fifteen-grain solution of gold to one ounce of water, and flood the plate until the desired colour is arrived at; thoroughly wash and pour over the following mixture (which can be made in quantity):—Cyanide of potassium ten grains, water one ounce. Let it dissolve, then put a few crystals of iodine into the bottle, and shake up; add until the cyanide will take no more up, then put a little more cyanide that it may be in slight excess of the iodine, and, after clearing out with the above, wash and let dry spontaneously.

The question repeatedly put to me is—What advantage do you claim with your process over the existing ones? My reply is—Simplicity, cleanliness, and economy. What is more simple than to dissolve the pellicle in warm water, and pour over the plate (no washing, no mess), and let dry? There is also a convenience in being able to coat any sized plate (and that is a consideration with some amateurs, as I have seen some of the oddest and most awkward sizes possible in the hands of beginners), and economy in being able to dissolve just as much as required, and no more, at a time. As to the results I will not say one word—you having some of them in your own hands.

This I consider to be essentially a dry process, but I hope to be able shortly to have something very favourable to report on its moist capabilities, as I am at present experimenting in that direction, and hope others will do so and give their experience.—I am, yours, &c.,

March 4, 1874. R. KENNETT.

HOWARD'S PORTABLE TENT.—This unique little tent is now accessible to all. The demands made for such a very compact method of working the wet collodion process in the field have been such as to induce Messrs. Lee Brothers, india-rubber manufacturers, of Watling-street—who were the first to make Mr. Howard's tent for private persons—to construct them for the public at large. The tent, as we have often explained, is a small triangular one which fits within the tripod-stand on which the camera is mounted; and when it is once hooked up to the triangle of the camera-stand it need not be detached during the day, but form part and parcel of the appurtenances which a photographer carries over his shoulder when proceeding from one view to another, even if some miles apart. Indeed the tent, from its inconsiderable weight and bulk, may be assumed to form part of the camera-stand. In constructing these tents Messrs. Lee Brothers have adopted all the minor yet valuable modifications suggested by those who have qualified themselves for expressing an opinion by their own active work in the field; and, as a consequence, the Howard tent may now be considered as supplying every condition requisite for preparing and developing a wet collodion picture when the artist is absent from home.

EXCHANGE COLUMN.

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

I have a $4\frac{1}{4} \times 6\frac{1}{2}$ doublet lens and a double backed camera which I will exchange for a pure compound stereoscopic lens, by Ross.—Address, Joseph Simpson, 46, King Street, Tunstal.

Wanted, Dallmeyer's rapid rectilinear lens $7\frac{1}{2}$-inch back focus, in exchange for Ross's A doublet $8 \times 5 = 10\frac{1}{2}$-inch focus and a pair of Edwards's quarter-plate combination printing-frames; both lens and frames quite new.—Address, J. Warburton, 66, Dickinson Road, Rusholme, Manchester.

ANSWERS TO CORRESPONDENTS.

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

G. Jansen.—The patent was obtained in 1869, and as it was not renewed it is now void.

In Type.—We must again crave indulgence on account of the large number of articles in type, for which we cannot this week find room.

Old Jed.—1. No addition will be required to be made to the silver bath.—2. The oxycalcium light will answer for producing enlargements.

Varnish.—Try the following:—Mix a little negative varnish with plain collodion, and with this varnish the plate. Have you tried the formula given in our last Almanac?

L. Trapp & Co.—We are informed by this firm that the Paris albumenised paper spoken of by Mr. Sutton in last number is the Trapp and Münch paper, M. Mayer being their Paris agent.

Alpha.—A note to the publishers of the manual will elicit the information required. Nitrate of silver is not soluble in cold alcohol, but dissolves fairly when the alcohol is heated. It is probable that what is meant is that the salt of silver mixed with the collodion should be the chloride.

"Copied."—You are evidently not to blame in acting as you have done, and no offence has been committed against the law, provided, of course, that the picture of the tombstone was not made copyright, which is very unlikely.

Amicus (Akroydon).—Great sensitiveness may be imparted to the gelatine emulsion by a slight excess of nitrate of silver; but this gain, we imagine, would be obtained at the expense of stability. We have not, however, made any experiments to test this latter point thoroughly.

The Photographic Society.—We have again to acknowledge the receipt of several letters on this subject, many of them from members, and containing useful suggestions. Our space, however, is too limited to warrant us in inserting them. We strongly recommend all members to be present at the next meeting.

A. J. Corrie.—1. We cannot offer any opinion as to the merits of the camera and slide shown in the engraving, but we unhesitatingly condemn the camera stand, which is faulty in principle and must necessarily in practice be very shaky.—2. We should prefer the lens by the foreign maker in respect of the qualities you mention.

Don.—1. Pot orange glass is less distressing to the eyes than ruby glass.—2. The studio you propose erecting ought to give you very fine results.—3. Any objection to the erection of such a studio can only arise from your immediate neighbours or the district surveyor.—4. Place the diaphragm about one and a-half inch from the front lens.

T. Roche.—State precisely the nature of the information you require. Have you any practical acquaintance with the special subject about which you inquire? and, if so, in what particular do you fail? Read our articles on *Enlarging* in the Almanac for 1870, and then let us know in what further direction information is required.

Photo.—The "gentleman" you name, and respecting whom you inquire, is really a lady. For some reason which we are at a loss to discover she adopted the name in question in connection with photography, and to photographers has been known by that appellation alone. Some day she may possibly come before the public under her real name.

Amateur (Limerick).—The plates appear to have been well prepared and are very sensitive. We exposed the largest of the fragments in which it was received (a bit about the size of half-a-crown) under a negative to common gaslight for eight seconds and obtained a good transparency. Adhere to the method of preparing plates you have adopted.

Chas. Carter.—Nothing can, of course, be done with the negative in the way of intensification so long as the film is varnished. Use a bath either of alcohol or of a solution of caustic potash, as recommended in our Almanac of last year, to effect the removal of the varnish, and then the picture may be intensified to any degree of force by one or other of the recognised methods.

Pilgrim.—It appears to us that the non-adhesion of the blacks is owing to the resinous substratum being too thick. Try again, wiping off as much of it as you can without entirely denuding the plate of the substratum. If the transparency is wanted to remain on the glass coat it with autotype varnish, which will ensure adhesion. We do not think that the age of your tissue has anything to do with your failure.

W. H. Wells.—1. The salt enclosed seems to be nitrate of barytes, although, from its precipitating action upon the silver bath, it does not seem as if it were very pure. Try another sample.—2. We cannot.—3. The toning bath may be used, notwithstanding its being discoloured.—4. Protosulphate of iron precipitates gold in the *metallic* form.—5. The silver in the fixing bath is undoubtedly worth recovering, and one of the best methods of precipitating it is by sulphide of potassium.—6. The proposer of the addition of barytes to the nitrate bath claims for it increased sensitiveness, and freedom from pinholes arising from supersaturation with iodides.

George R. Brooks.—This correspondent is annoyed at finding many of his negatives quite spoiled from crackings extending all over the surface, and he asks us to aid him in preventing this disagreeable state of matters for the the future by giving him a word or two of seasonable advice. First of all, the *cure* for a negative which has already become covered with splittings or cracks of the kind described is to rub it over with powdered lampblack, by which means the cracks are filled up. The means of preventing such cracks may be found in keeping the negatives stored in a dry room, each negative being wrapped up in paper or, better still, packed in an envelope.

F.R.S.—You are right in asserting that an ordinary mirror, no matter how perfectly made or selected, will not answer for the production of a portrait or any other photograph obtained by reflection from such a medium. You are further quite correct in stating that there are more images than one reflected from a mirror of the ordinary kind—a subject which we discussed at considerable length in our Almanac for 1871. But, while quite admitting this, we have to say that if, even when using an ordinary mirror, the angles of incidence and of reflection be very acute, as respects each other a double image will not be visible, although it exists theoretically; further, that if the silvered surface of the mirror be the external one, the image formed will not be either theoretically or practically doubled no matter what relation the angle of incidence bears to that of reflection; and finally, that not only two, but eight or ten, images of luminous objects are invariably formed by means of an ordinary mirror, the number of the images visible being determined by the obtuseness of the angle the incident and reflected rays form to each other.

South London Photographic Society.—At the next meeting of this Society, which will be held at the rooms of the Society of Arts, John-street, Adelphi, on Thursday next, the 12th inst., Mr. S. Fry will read a paper *On Studios*, illustrated by a model.

London Photographic Society.—The ordinary monthly meeting of this Society will be held on Tuesday next, the 10th instant, at 9, Conduit-street, Regent-street. At this meeting the members present will be called upon to elect gentlemen to replace those who resigned at the annual meeting last month, including a president, two vice-presidents, and *two* honorary secretaries. A full meeting of members of the Society is anticipated.

Photography at the Royal Institution.—The lecture on photography recently delivered is only the second discourse upon this subject that has been given at the Royal Institution. The first one was delivered about fifteen years ago by our predecessor, Mr. Malone, the special topic selected by him being photographic engraving. At the *conversazione* in the library which followed the delivery of Mr. Heath's lecture, the exquisite beauty of Mr. Heath's pictures, of which there was a large collection exhibited, elicited the highest encomiums from the distinguished assembly.

LONDON GAZETTE, *March* 3, 1874.

Partnership Dissolved.

J. Burton and Sons, Leicester; and also in Burton-upon-Trent, Stafford; Oakham, Rutland; and Melton Mowbray, Leicestershire, photographers, as concerns J. Burton.

METEOROLOGICAL REPORT,

For the Week ending March 4, 1874.

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

These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb	Max. Tem.	Min. Tem.	Remarks.
26	29·32	SE	43	45	49	35	Rain
27	29·22	SW	47	47	54	42	Fine
28	29·99	WSW	49	40	54	37	Dull
March.							
2	30·37	E	42	42	51	41	Foggy
3	30·59	E	40	40	50	40	Dull
4	30·61	NE	37	38	—	35	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 723. Vol. XXI.—MARCH 13, 1874.

ON THE INFLUENCE OF APERTURE IN PORTRAIT LENSES.

Many years have now elapsed since a somewhat acrimonious battle raged between two men of science respecting the influence of aperture in a portrait lens; and in an article we published a fortnight ago Mr. Beattie reopened the subject, although his remarks were briefer or less comprehensive than they might have been.

The doctrine involved in the subject is the following, which we express in the most concentrated language at our disposal, and which we borrow from Sir David Brewster:—"All portraits taken by means of large lenses are monstrous caricatures." We shall now proceed to examine into the precise truth of this strong assertion, without having regard to the adverse strictures of newspaper critics expressed on the collection of pictures of large dimensions brought together last year in response to Mr. Crawshay's invitation.

To the above assertion it has been replied that it is incorrect, in proof of which it is only necessary to photograph a fine line engraving by means of a properly-corrected portrait lens of large dimensions, when the fallacy of the assertion that every image formed by a lens of this character is really an overlapping series of over a hundred images will be demonstrated by the photograph in question being a *facsimile* of the original. This, we may observe, is really the case. If a lens a foot in diameter were employed to delineate such an object as that spoken of, and the lens were properly corrected, every speck and line on the engraving would be represented by a speck and line in the photograph, bearing the same relation to the dimensions of the photograph as the original does to the engraving that is copied. In the reproduction of objects on one plane the diameter of the lens is of no consequence whatever.

But, in the case of objects or planes situated at various distances from the lens, an entirely different principle from that of the representation of a single line or point is brought into play. In order to institute a comparison between this and the previous condition of things we must now suppose that, instead of only one engraving, we have three, printed upon colourless glass, one situated a little behind the other. If a photograph were now attempted to be taken everything would be found jumbled, and not a line distinct. While a well-corrected lens of large diameter is capable of depicting with accuracy and distinctness any points situated upon one plane, no sooner is a subject having *depth* presented to such a lens than every portion of the surface of the lens has a "look" at it from its particular point of inspection; and, in the case of a lens of five inches in diameter, it is obvious that the top, bottom, right and left sides will each see the object from different and widely-separated points of observation, and, not only so, but each point will cause to be photographed exactly what it sees, the result being a great number of stereoscopic pairs of pictures compressed into one single image. It is the easiest thing in the world to prove this. All that is necessary is to focus a good, steady sitter, and, by means of a brown paper stop placed in front of the lens with an aperture at one side, to take a portrait; and then, after turning round the diaphragm so as to expose the opposite side of the lens, to take a second portrait. When these two portraits are placed in the stereoscope they will be found to be as perfectly stereoscopic as they would have been had they been taken by two small whole lenses placed side by side, as in an ordinary binocular camera.

The well-known binocular microscope is based upon the principle that objects present a different appearance to one side of the minute microscope objective to that which they present to the other side; and the appearance of solidity is obtained by directing the opposite portions of the body of pencils transmitted by the objective up separate tubes to enter the right and left eyes respectively. Stereoscopic relief is the result of the fusion by the brain of two dissimilar views of a solid object; hence to attempt to blend together upon a *flat surface* dissimilar views of such an object must, of necessity, cause confusion, and the more dissimilar the views the more dire the confusion. As this subject lies at the very root of the possibility of taking correct portraits by means of large lenses, we are desirous that sound views should be implanted in the minds of our readers, for many erroneous notions seem to be entertained.

About nine years ago a patent was taken out by a gentleman for blending two stereoscopic pictures in one upon a sheet of paper. Now, as stereoscopic pictures are not identical, it follows that if these two dissimilar images are superimposed the outlines will not coincide; indeed, it is a sheer impossibility for them to do so. Twenty years ago an attempt was made at the Polytechnic Institution to get the two dissimilar images of stereoscopic transparencies of the statuary of the Louvre to coalesce upon the screen when projected on one spot by means of two lanterns; but, notwithstanding an assertion publicly made by a gentleman who is a better photographer than a physicist, that a stereoscopic effect was produced, we know that it was simply impossible, for stereoscopic pictures never have been, and never can be, produced by overlapping them on a flat surface. If they do overlap or fit each other in every part they are similar and not stereoscopic or binocular images, and hence no relief can be obtained.

What we have said applies equally to portraits taken with large lenses; but it is possible to use even a large lens under such conditions that it shall not be large. This paradox requires explanation. All lenses are relatively large or small in proportion to their distance from the object being photographed. A lens of five inches in diameter and proportionate focus, if pointed at the nasal organ of a sitter within four feet, as some appear to have been doing of late, will produce a portrait quite different to the result obtained if it be removed to a distance of forty feet. At the latter distance it would have become relatively a small lens, and would produce a different kind of picture—different in drawing and in perspective—to that taken from the nearer point. The former, if enlarged to the dimensions of the latter, would be a harmonious portrait; the latter, on the contrary, would necessarily savour more or less of the pudding-faced caricature which Sir David Brewster unceremoniously designated as a "monstrosity."

The distortion that arises from parallax, or the diameter of the lens in relation to the distance of the object photographed, must not be confounded with that which arises from the adoption of too near a point of sight, which merely produces a too violent perspective, causing the nose to be abnormally large in comparison with the ears.

This is bad enough, but in the distortion we are now speaking of there is not only this but a great deal more; for, as we have said, each portion of the lens sees the object from its own particular point, and it photographs upon the flat sensitive plate of glass exactly what it sees. We have not merely violent perspective as a whole, but we have, further, a photograph resulting from a combination of a great number of images—no two of them alike as respects drawing, and all of them being violent in perspective. Hence the peculiar "monstrosity" of such portraits.

Place a card on its end, with the edge towards a large lens; both sides of that card will be seen on the ground glass. In proportion as the aperture is reduced, or the camera is removed from the card, so does this phenomenon disappear. Let us not be misunderstood in regard to the distortion of parallax. No lens is entirely free from it; but its presence cannot be detected when a lens of moderate size is used at a distance from the sitter of as much above ten feet as possible.

The future of large portraits depends upon perfection in the methods of producing enlargements.

OXALIC ACID IN THE SILVER BATH.

In an article in this Journal of the 30th January last we mentioned the fact that Mr. A. L. Henderson was carrying out some further experiments upon the effect of nitrate of baryta in the negative bath, and expressed a hope that we might shortly have the opportunity of referring to the matter, and reporting the results of Mr. Henderson's renewed researches. We are sorry that we have not been able to carry out our intention, as pressure of business has prevented our friend from concluding the proposed experiments; otherwise we should have no doubt been informed of the results.

The subject of the nitrate bath is one which comes so constantly before the photographer that it is impossible he can ever be oblivious to it, and, as it presents itself in a new phase from time to time, a new set of ideas not unnaturally arises in like manner.

In a still more recent article we alluded to the statement that had been made to us that *fulminate of silver* was occasionally produced in a nitrate bath, and this was supported by what we considered good authority; but, upon examination of some of the crystals presumed to be fulminate of silver, and obtained by filtration from several gallons of bath solution, we are inclined to think that they consist not of fulminate but of *oxalate* of silver—a very insoluble salt, and the source of which, at first sight, is not very clear.

Many years ago, however, Mr. John Williams (of the eminent firm of Hopkin and Williams, manufacturers of photographic chemicals) pointed out a source of oxalic acid not generally suspected, viz., in the collodion itself. In the discussion upon a paper read by Mr. J. E. Mayall before the London Photographic Society so long ago as May 3, 1859, Mr. Williams pointed out that collodion could contain or acquire a very large proportion of oxalic acid, a sufficient quantity to produce one pound five ounces of oxalate of lime being formed in the residue after the distillation of the ether from twenty-four Winchester quarts of old collodion which had been sent to him for the purpose of separating the ether therefrom.

We think, therefore, it is highly probable that the formation of the crystals alluded to in our late article may be traced to the presence of oxalic acid in one or other of the samples of collodion employed. This is a point upon which we shall be glad to have the experience of other observers, and we shall take an early opportunity of recurring to the subject.

THE LONDON PHOTOGRAPHIC SOCIETY.

We are sure that all our readers will learn with satisfaction that the division among the members of the London Photographic Society has terminated, and that the President, Vice-Presidents, and other officers of the Society who resigned at the February meeting were, on Tuesday last, unanimously re-elected to fill the situations they had vacated.

The whole proceedings were marked by such a spirit of mutual forbearance and conciliation, and so extreme a desire to re-heal the wounds received in party warfare, as well as to remove anything that might in any sense be considered as hostility, that we feel convinced the harmony now restored is deep and genuine. No sooner were the late officers of the Society reinstated than the smaller number who were elected at the last meeting placed their resignations in the hands of the members—not, however, from any feeling of antagonism, but purely to show that they held office only at the desire of the members as a whole and not of any section. With equal unanimity these gentlemen were re-elected to fill the seats they had vacated. We entirely endorse the Chairman's words—Mr. Jabez Hughes—"that if ever there was a Council unanimously elected it was this one."

As if still further to cement the restored feeling of cordiality among the members, Mr. Sebastian Davis selected the occasion to propose that the silver medal of the Society should be presented to the President, Mr. James Glaisher, F.R.S., for his able services during a long series of years; this was seconded by Mr. Wenham, who dwelt on the benefits rendered to the Society by Mr. Glaisher. The motion was carried by acclamation, and this formed the appropriate and crowning act of reconciliation.

There was an excellent list of names proposed as an amendment by Colonel Stuart Wortley, and which under other circumstances would have merited serious consideration, but the feeling of the meeting was so distinctly against it, as not being in harmony with the prevailing spirit of conciliation, that Colonel Wortley withdrew it. It is true the Chairman ruled that it was out of order on other grounds; but there is little doubt that, as it interfered with the conciliatory project of re-electing *en masse* the old officers, it constituted a more formidable objection than the legal one raised. Under all the conditions we think the members adopted not only the wisest but also the most graceful method of extricating themselves from their difficulties.

Although it has been an unpleasant trial to pass through, yet we shall be surprised if in the end the Society will not be finally benefitted. Clear proof is now given that the dormant days are passed, and that a large amount of vitality and energy exists among the members which, when directed to the legitimate ends of photographic pursuits, must be of great advantage. One thought arises—whether the present is not the proper time, seeing the Society is being re-organised, for so enlarging its base and scope as to constitute it the veritable photographic society, not merely of London, but of Great Britain. It can scarcely be called a local society when its members are scattered over the United Kingdom, especially when the executive, as it will be in future elected, are chosen by members residing in all parts of the country. The proper time to consider this subject in all its bearings will be, perhaps, when the new laws are undergoing discussion.

We often hear of the difficulties of working the collodion process in India and other hot climates. These do not arise merely from the volatility of ether and alcohol—which is admitted to be a considerable drawback—but often from quite different causes, such as the mere transport. We heard the other day of a gentleman, a distinguished amateur, when on board one of the P. and O. steamers, having a bottle of collodion in his possession which he had not declared, being in a state of terror for fear of discovery, the penalty being some £200. This gentleman is now an ardent worker of the gelatino-bromide process, and one of its recommendations, as he resides chiefly in India, is getting rid of the troubles incident to collodion. Gelatine is certainly removed from all the difficulties of transport, the vexations of the Excise laws, and the heat of climate which are associated with ether, alcohol, and collodion, to say nothing of gun-cotton itself, which substance shippers hold in abhorrence.

In our last number Mr. Sutton noted the fact that a beautiful negative which had been transferred to gelatine had in the course of a short time become entirely spoiled and mouldy from the action of a damp atmosphere, and lamented the probability of many such negatives meeting with a similar fate if the mode of procedure, viz., the gelatino-bromide process, should ever come into extensive operation. It may be well to mention, in connection with this subject, that a very small proportion of pure carbolic acid suffices to prevent the putrefaction or mouldiness of gelatine in a very marked manner. We have kept a soft gelatinous mass—not dried, be it remembered—perfectly sweet and free from mildew for upwards of twelve months, merely by the addition to it of a few drops of medicinal carbolic acid.

ON REDUCTION BY LIGHT AS INFLUENCED BY COLOUR. *

The foregoing investigations seemed to indicate but little connection between the colours of the bodies placed in contact with the various sensitive substances and any increased or diminished sensitiveness to particular rays resulting from that contact. The continuation of my work with silver bromide showed similar results, and I was thus led to reflect whether the contact of *colourless* bodies with silver bromide might not influence its behaviour to particular rays, as much as the contact of coloured bodies. I was, therefore, led to include in my examination of silver bromide the action of several colourless and nearly colourless bodies, viz., salicine, infusion of tea leaves, and infusion of capsicum. Salicine I had tried several years ago as an accelerator; infusion of tea is well known to exercise the same function, and infusion of capsicum I found some years since to have a similar action. Salicine was particularly suited for the present purpose, being entirely colourless. The two infusions named imparted to the papers only a faint neutral colouration.

The result confirmed my anticipation. Colourless substances proved to have just as strong a discriminating effect on particular rays of the spectrum as coloured; in fact, no substance of all that were tried exercised so marked an interesting effect on particular rays as did the wholly-colourless salicine.

This, if I am not mistaken, is a new fact in photo-chemistry—that the degree of sensitiveness exhibited by silver bromide to rays of particular refrangibility may be modified (and very much modified) by placing in contact with it a colourless and neutral body. Nor is the interest confined to the theoretical point of view, but valuable conclusions may also be deduced for photographic uses.

In view of the importance of the subject, and the difficulty of fixing with any degree of precision the reactions of silver bromide, the trials were repeated—always, and often many times, giving the following results:—

Substances in the order of sensibility conferred on the *more* refrangible half of the spectrum.	Substances in the order of sensitiveness which they conferred on the *least* refrangible half of the spectrum.
Infusion of tea leaves.	Salicine.
Salicine.	*Plain Bromide.*
Red litmus.	Aniline green.
Coralline.	Mauvine.
Aniline blue.	Aniline blue.
Plain Bromide.	Aurine.
Aniline green.	Infusion of tea leaves.
Mauvine.	Coralline
Cold infusion carthamus	Infusion of capsicum.
Infusion of capsicum.	Cold infusion carthamus.

Several very interesting deductions may be drawn from this table. In the first place, it is evident that the sensitiveness of silver bromide is much more easily heightened to the more refrangible rays than to the less. Otu of the substances tried five heightened the sensitiveness to the blue and violet rays (and also to the white light), whilst only one increased it to the red and yellow half.

The influence of salicine was exceedingly remarkable. When silver bromide is exposed to a range of coloured glasses from violet to red there is some effect produced in the green, and almost none in the orange and red. Now, all the other substances tried in connection with silver bromide, even when they increased the sensitiveness to the violet end (tea, red litmus, coralline, and aniline blue), nevertheless diminished it to the red end, with the solitary exception of salicine. The paper prepared with salicine exhibited a continuous degree of sensitiveness over the spaces of the green, yellow, orange, and red, all of which were approximately equalised.

All due precautions were taken to free the experiments of which the results are given above from sources of error. These especially arise from the inequality of sensitiveness in different parts of sensitised surfaces. Accordingly, baths of equal strength were used, and the papers were floated or immersed, as the case might be, for exactly equal times. Paper, when hung up to dry, becomes always more charged with soluble matters at the lower end, and are, therefore, generally more sensitive at that end. To eliminate this irregularity care was taken always to hang up the same end in successive treatments, and in exposing to keep the corresponding ends of all papers to the same end of the spectrum. These precautions are essential; without them no concordant or reliable results could be obtained. So, too, in the development: all comparative trials were developed together in a very large bath, all were put in at once and removed at once, and were kept incessantly in motion during the whole progress of development to ensure uniformity of action. Similarly with fixing and washing. In a word, no trouble was spared to make the comparisons fair. The table just given is the result of forty trials, in nearly all the cases each trial covering the entire range of colours.

Although the results which I have obtained differ materially from those announced by Dr. Vogel, I do not present them as necessarily contradicting or disproving his. No one who has experimented carefully with silver bromide needs to be told how very difficult it is to reason on its behaviour, or to foretell what results will follow from any given treatment. Dr. Vogel's experiments were made on silver bromide free from silver nitrate, or, at most, containing an infinitesimal quantity of it; in mine the bromide was in presence of a certain quantity of free nitrate. The papers were not washed after sensitising. Also, the effect of a collodion film is very different from that of paper—so much so, that the paper and collodion negative processes are exceedingly different. In working with silver bromide on paper the bromide comes in contact simply with pure cellulose, starch sizing (in the case of my paper), and such substances as may be intentionally added. The purest and best Saxe paper was in all cases used. In a collodion film there are present decomposition products of the nitro-cellulose, caused by the alkaline bromides dissolved in it, and left for days or weeks to react upon it. A portion of the plates used by Dr. Vogel were commercial plates prepared by a secret process. It is, therefore, uncertain what substances were present together with the colouring matter in the first trials, or were washed out with it in the comparative experiments.

Whilst fully appreciating the interest which attaches to Dr. Vogel's investigation and his reliability as a practised experimentalist, I cannot help concluding from my own results that there exists no law connecting the colour of a substance placed in contact with a sensitive body and the increased or diminished sensitiveness imparted to that body as respects particular rays of light.

Deductions Interesting in Connection with Practical Photography.

Although the foregoing investigations were undertaken with a view to establish principles only, nevertheless they give useful information in connection with bromide dry-plate work.

Some years ago I proposed in this Journal the plan of colouring the film instead of applying backing. For a long time I used red litmus for this purpose and got excellent negatives with it; but eventually I found that the negatives required to be developed within a few days after exposure, and this caused me to discontinue its use. The red colour was also not as intense as desirable.

Lately this method of applying the colour to the film instead of the back has been modified (first, I believe, by Mr. Cooper) by the use of aniline colours instead of litmus. Three—rosaniline, coralline, and aurine—have been used. The preceding investigation indicates that rosaniline and aurine cannot be expected to give as good result as coralline, which latter substance has, moreover, the great advantage of easy solubility in water.

Nevertheless, whilst heightening the sensitiveness to the violet end, it diminishes it to the red half of the spectrum. At least, it undoubtedly acts thus upon silver bromide in paper and in presence of free nitrate silver, and, but for the experiments of Dr. Vogel, I should anticipate the same results in the case of collodion films. In any case, the favourable action of coralline must, I think, be expected to lie at the violet end of the spectrum. Salicine exerts a most favourable effect upon the sensitiveness to the red half of the spectrum; hence the combination of the two ought to give most excellent results in photographic practice. I am, of course, aware that the use of salicine has been already advocated by others in your columns, and although I used it myself years before, yet priority of publication settles discovery, and I make no claim to it. Whether the two substances, coralline and salicine, have been used together does not appear, I think, from anything that has been published. I have not, as yet, made any experiments on their joint use, having in my city laboratory no conveniences for negative work, but on returning to the country in a few weeks I propose to ry them. I

* Concluded from page 111.

shall not add either substance to the collodion, but employ them both in the accelerating bath applied to the washed plate. Coralline is so readily soluble in water that it can be applied in this way.

M. Carey Lea.

SUTTON'S MOIST PROCESS.

As soon as I saw Mr. Sutton's communication on the use of moist plates for printing transparencies I felt that he had hit the right nail on the head, and that the millenium of those who love stereoscopic pictures had at last arrived.

By means of wet plates and iron developer I have produced a few first-rate prints, but the tone was very uncertain, and where the negative had much bare glass—as in the case of interiors—it was difficult to prevent a slight fogginess. For Mr. Sutton's plan I used Mawson's collodion, about a year old, washed in a dipping-bath, and then poured a few ounces of water over the back and front of the plate. I used albumen, one part to six of water, and filtered through sponge. After exposure I washed off the preservative and developed with—

Pyro.	3 grains.
Acetic acid	1 drachm.
Water	2 ounces.
Silver	20-grain solution.

In cold weather half the above quantity of acid seems sufficient.

Two drachms of the pyro. solution and four minims of silver bring out the image in about half-a-minute. Drain off the developer into a measure, when the image soon acquires strength; then add some more silver, and pour on and off until the right tone is obtained. Fix with cyanide.

The film appears to be very tough, and I cannot say too much in praise of the sharpness and brightness of the positive. The tone I produced was a rich brown.

I suppose the exposure is regulated by the strength of the developer. I have allowed from twice to four times the exposure required for a wet plate developed with iron, and have obtained excellent results in each case.

In fact, I am perfectly delighted with Mr. Sutton's process; and, though country members of the London Photographic Society count for nothing, I cannot help thinking that a medal of the first class might be worse bestowed than on that gentleman.

E. C. Buxton, Jun.

GELATINO-BROMIDE EMULSION.

Having promised myself an experiment in the gelatino-bromide emulsion ever since the discovery of the process, it was not until this week I could devote any time to it; and, like most other experimentalists, I looked round to see from what quarter I was likely to borrow an idea or two.

Although much has been said respecting exquisite plates being prepared by the process, yet it is clear enough that little has been made known respecting the working of it. Mr. King, I think, has been the only experimentalist who has laid anything really valuable before the readers of this Journal. The idea of dialysis is one that few photographic experimentalists would be likely to stumble against in the search for a practical means of eliminating the nitrate of potash that is formed in the emulsion. The greatest difficulty seems to be cleared away at the very start.

Should gelatino-bromide emulsion become as extensively and successfully worked as Mr. King has pointed out, he is the gentleman for our first medal, unless some patentee of an emulsion process should advertise himself into the favour of the committee who may have the awarding of that distinction.

Now, my own experiments have not been with dialysis; for I have been seeking to get rid of the nitrate of potash by other means. To effect this end I first place forty grains of Nelson's gelatine in an ounce of distilled water to soak for a few hours. It is afterwards dissolved by placing the cup containing it in a pan of hot water; then sixteen grains of bromide of potassium, in another cup, is dissolved in either a large or small quantity of tap water; then twenty-three grains of nitrate of silver, in another cup, is treated, like the bromide of potassium, with an unsparing supply of water. Now teem the silver solution into the potassium solution, and a flocculent precipitate takes place, which is bromide of silver, the nitrate of potash being in solution. The supernatant liquid is now decanted, and the bromide of silver washed with water. The great evil is carried away in the washing, and pure bromide of silver remains at the bottom of the cup. Drain the water off as thoroughly as possible without losing the precipitate; place the hot solution of gelatine by your side, with a spoon in it, by which means you can add the gelatine in small quantities to your silver. Place a pestle in the cup (or it may be a mortar, if preferred), and, as the gelatine is added, grind it until it and the flocculent bromide of silver are incorporated and the latter held in suspension. The gelatine solution being double the strength of that of the finished emulsion it will probably become pasty as it cools. By placing it in the hot-water pan close at hand it again becomes fluid. When the whole of the gelatine has been added the bulk can be increased by the addition of an ounce of distilled water, and all is complete except the bottling of it.

To prepare the plates, have a large board, like a small drawing-board, clamped at the ends, hung with four strings, after the manner of one side of a pair of scales. This can be hooked in position and made to hang quite level, which it will do ever afterwards immediately it is fixed. Pour on the emulsion like collodion, returning the excess to the bottle. The plate will now look like a piece of opal; but, if held up for a short time only, your gelatine emulsion will almost drain away. After the plate is coated, and the surplus drained into the bottle, lay the plate on the board, and pour a little more emulsion in the centre; it will flow gradually up to the edges, but not run over. Your stock of plates coated, the drying of them depends upon the dryness and warmth of the atmosphere in which they are placed. After standing a night in a suitable room they are ready for the camera.

I cannot promise that plates prepared after this fashion are quick, for my experience points out that they are slow—much slower than an ordinary collodio-bromide plate; but emulsion plates are singularly free from defects incidental to plates prepared by the bath and collodion.

Mr. Bolton states, in The British Journal Photographic Almanac, that he abandoned the idea of mixing bromide of silver with gelatine solution; but I have found it singularly easy to obtain a homogeneous and structureless film. I intend to try a film with an excess of silver, believing that gelatine itself would act as a restrainer in preventing fog, although a drop or two of nitric acid might be added for that purpose without any deleterious effect. If the gelatine emulsion will retain an excess of silver—and I see no reason why it should not—this is the direction to look for instantaneous dry plates.

I shall now describe a modification of the above for making up an emulsion, believing that it is an alternative mode of obtaining quick plates to that which I have suggested with an excess of silver.

I prepared the bromide of silver as in the first instance. Having cleared it of excess of water I added a few drops of liquor ammonia, using the pestle until it became a cream, the ammonia being a solvent of it. The hot gelatine solution was added, when a very little stirring resulted in a beautiful creamy emulsion. I coated some plates with it, and on development the image was fogged, and seemed to have formed itself at the back of the film instead of on the face of it. I am not sure that the defect is inherent in the preparation, for I am apprehensive that the emulsion was affected by the gaslight before the plates were coated; but it is my intention to give this plan another trial, for I never saw a piece of opal glass look more beautiful than these plates when I was coating them.

It may be deemed unwise to bring forward a half-completed process of working the gelatino-bromide emulsion; but it is evident that there are several ways and means of accomplishing the same end. The spring is approaching, and photographers are bethinking themselves of the dry process that is best. To those who delight in large plates the question of cost is a weighty one, while in the case of others the peculiar kind of pyroxyline necessary to harness up their favourite hobby is a drawback; but, if the gelatine emulsion process come at all up to the mark, the ease of obtaining the requisite material will be a recommendation in itself, besides the negative virtue of not requiring to keep a stock of anything ready at hand.

If two or three amateurs work out the suggestions which have been made, a month hence would see us independent of anything that may be offered commercially, and the ghosts that haunt our dark-rooms, and play such pranks with the bath and collodion, will have "to find fresh fields and pastures new."

A word or two on the development of the gelatine emulsion plate may be acceptable, as containing a new idea, even if it be far from the best way of accomplishing it:—

The plate, when dry, is somewhat repellant of the aqueous solution, and the consequence is that development is rendered difficult. The part that has been screened from the light by the rebate of the dark slide is cut off with a sharp knife by the aid of a straight edge before commencing to develope. The plate is flooded with glycerine and water (a drachm of the former to an ounce of the latter), pouring on and off two or three times. I then apply a three-grain solution of pyro., with a drop or two of bromide five grains to the ounce; this is likewise poured on and off two or three times, and a drop or two of a solution of ammonia (one part of liquor of ammonia to ten parts of water) is added. The development now goes on comfortably.

I fixed one or two plates in white light, which were stained a deep yellow. Again: in my anxiety to see how the plates would turn out, the first one or two I exposed were imperfectly dry—or rather not dry at all in some parts—and these very parts broke out in dreadfully measly sort of blisters. Plates dried by a strong heat looked like a sheet of No. 2 sand-paper.

I hope to improve on my first trials; and I have in my mind's eye a scheme for converting the emulsion into a dried sheet, and that without infringing on any patent claims. J. W. Gough.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

A New Magic Lantern.—The revolving camera invented and patented by Mr. Hodgson, of Sheffield, may answer in a sort of way for small plates; but for pictures of large size it will never do, unless one can afford to hire a small cart to carry the plate-holder. It suggests to me a neat arrangement I once saw for exhibiting transparencies in the magic lantern, and which might also, with very little trouble, be made to answer for holding and exposing sensitive plates in the camera.

Every one knows the internal construction of a cabinet stereoscope—I mean one of the kind that contains fifty or a hundred pictures, which are presented in rotation to the spectator by the simple act of giving a quarter of a turn to a knob that projects from each side of the cabinet. By that partial revolution of the handle the upper picture of a series is brought from a horizontal to a vertical position opposite the spectator's eyes; while, by the same movement, the picture previously erected for observation is made to resume a horizontal position, and passes away to be seen no more until every picture contained in the cabinet shall have passed the point of observation.

The magic lantern now to be described was contrived and made by a gentleman whose name has long been familiar to readers both of this Journal and its Almanac; and a few hints concerning its construction may be useful to those who would like to adopt a similar system.

The lantern is adapted for either the lime light or an argand lamp. The tube or nozzle differs from that of the ordinary lantern in respect of its being made square and deep, not unlike the cabinet in which microscopes are usually packed. In the front of that cabinet, and about three inches from the top, is screwed the object glass, which is a quarter-plate French portrait combination, so constructed as to give a very flat field. At the back are inserted the condensers, the one nearest to the light being a plano-convex three and a-half inches in diameter; that next to the object-glass being five inches, and double-convex.

In the cabinet are arranged a number of light frames made of tin, each one capable of receiving a lantern transparency, and attached by the lower edge to an endless band, which passes over two square axles in a manner similar to those of the cabinet revolving stereoscope. When filled with transparencies these are, by a quarter of a revolution of the knob which projects outside, brought one after the other, in as rapid a succession as may be desired, into a vertical position, direct in the axes of the condensers and object-glass.

The object of having the anterior condenser so large as five inches is to provide for the necessity which exists of having the picture that is "on" at such a distance from the condenser as will enable it (the picture) to be revolved on the axle without touching the condenser. The picture is thus situated in the path of a cone of rays having a base of five inches, and is very uniformly illuminated.

The lantern proper, or dark box that surrounds the light, may be made of any convenient form, so as to contain the lamp or burner and secure ventilation. It has a circular aperture in front, of sufficient dimensions to admit the condensers, which project from the cabinet described, and with which is connected, by direct attachment, all the lenses and apparatus belonging to the lantern, with the sole exception of the light. This optical cabinet is firmly fastened by means of keyhole attachments to the body of the lantern, which, in turn, is attached to a very rigid stand.

One or two refinements have been introduced. For example, a square brass four-sided wheel—if I may use such a term to such an appliance—against which a stiff spring acts, is placed on the axle which carries the knob outside and which sustains the pictures inside. This ensures that each picture will stand straight up and in correct position in relation to the object-glass. A refinement upon this is a stop which works automatically when the handle is rotated, and against which each picture is brought up hard and fast when presented to the lens. This obviates all necessity for subsequent focussing after the first picture has once been focussed.

But it confers another advantage—it enables one to dispense with the services of an assistant in changing the views; for, by means of a simple mechanical appliance, the mere act of pulling a string, which may be of sufficient length to reach from the lantern to where the lecturer stands, suffices to change the picture in less than a second of time.

A further improvement consists in an opaque screen being dropped close to the lens during the brief interval that one picture is being supplanted by the other, this, too, being effected by an automatic arrangement. Every exhibitor of photographs by the lantern will bear me out when I say that it is unpleasant to see displayed on the screen the act of changing the views unless it be effected by dissolving by a pair of lanterns. During the momentary stoppage of the light one picture has been removed and its place occupied by another, the effect being really good if it be expeditiously done; and it may be all done in less than a second. A screen of ground, or ground and coloured, glass can be advantageously used instead of the opaque screen spoken of.

* Concluded from page 112.

REMARKS ON THE REPRODUCTION OF NEGATIVES.

In your issue of the 6th ult. the neglect of photographers to reproduce those negatives which are valuable, and from which a large number of prints are or may be required, is shown to be one which, in case of any accident to the negative, may seriously interfere with the profit resulting from the sale of such prints, owing to the cost of spotting out, &c., required. Well do I remember the look of weariness expressed on the face of a young lady whose duty it was to spot out the *cartes* resulting from a large order of a celebrity whose negative had been damaged owing to some misadventure.

The power of being able to reproduce with ease a negative, the prints from which reproduction could not be distinguished from those resulting from the original, would confer advantages which most of us would be glad to possess. The means of doing so at present may be briefly recapitulated, and their defects, from my point of view, mentioned.

First is the wet collodion process, by which a transparency is produced in the ordinary way, and developed either by iron or pyrogallic acid. From a picture so produced a negative is made by repeating the process, substituting for the negative the positive made in the first operation. The transparency may be of an enlarged size or otherwise. Should it be an enlarged one the result, when the negative made therefrom is a reduction, is more likely to be satisfactory, because any defects due to errors in manipulation in the positive are reduced. An excellent result may be obtained by the judicious retouching of the transparency before the negative is made; but this is foreign to the subject in hand, as reproduction is in this case impossible.

The defects are those inherent in any process where development is owing to the precipitation of particles, and also optical difficulties, the greatest of which, I am inclined to think, is that of focussing sharp. Many may treat this last lightly, but a little thought will soon show its importance. Yet, after all, my opinion is that the capabilities of the wet process for purposes of reproduction have not yet reached their full development.

Secondly: when a dry plate is superimposed on a negative and a transparency thus made, by a repetition of the process, again substituting the transparency for the negative, a result is produced in no way inferior to the original. An excellent variation is that proposed some time since, and based on the reduction of bromide of silver and the subsequent solution of the metal leaving the unaltered bromide behind. In this manner a negative is reproduced at one operation, and without the intervention of a transparency. It would be difficult indeed to find, amid all our varied processes, a more beautiful operation than is involved in the means named. The collodio-chloride process may be classified with dry plates, and for purposes of reproduction is inferior to none of its class, it only being a question of a long exposure compared with a bromo-iodised film, yet having the advantage of dispensing with development, and by those unaccustomed to the development of dry plates it must be favourably received.

The disadvantages in all processes where glass is the material employed for the support of the body or bodies about to be used are obvious, unless plate glass be employed; and probably there are few photographers who indulge in the luxury of this article, to say nothing of the trouble of preparing dry plates (it is a trouble when your hands are tolerably full of ordinary work). Further: any method eliminating the uncertainty of exposure and giving equal results would, without doubt, supersede any dry plates.

Then comes the carbon process. Anyone writing in a disparaging manner of this process would betray an entire ignorance of its powers. It certainly has produced in the hands of skilful manipulators results inferior to none. Theoretically, for the reproduction of negatives the size of the original, the process is perfection itself; for, if a piece of suitable carbon tissue be exposed under a negative, every portion of it which is acted upon by the light is, after development, correspondingly opaque to its transmission and in the ratio of the exposure received. If, now, another piece of tissue be placed in contact with a transparency so produced and printed, a negative is the result, having for printing purposes no difference from the original. Photographers are, as a body, very slow to take up anything likely to change their mode of working, otherwise it would not require any efforts of mine in this advanced age of carbon to point out its worth; but the "time will come." Yet I apprehend a means whereby the production of a transparency could be watched like that of a silver print would have charms to many that none other could have, and to such attention may now be drawn.

Some time since a gentleman gave what is a valuable means for the production of transparencies for any purposes (I really forget his name, otherwise I should be glad to "render unto Cæsar the things which are Cæsar's," but I hope he will take the will for the deed). A sheet of paper was coated with a solution of india-rubber, and then again with chlorised albumen. When dry this was sensitised, printed, and fixed in the ordinary manner, with the exception of printing very dark. It was then transferred to glass, the paper being removed by the re-solution of the india-rubber. By the aid of this process the reproduction of negatives is so obvious as to require no comment.

With chloride of silver as the sensitive body it is at once evident that a great number of changes may be rung. With a gelatine emulsion of chloride of silver (I here give a hint to Mr. Kennett that the supply of it might be profitable as "transparency pellicle"), and also with sheets of gelatine, I have obtained very promising results.

I will now conclude by giving an outline of a process I intend experimenting further with, in the hope that those who have time to spare and feel inclined may give it a little attention. A sheet of mica or paper is coated with a solution of india-rubber, then with collodio-chloride of silver fumed with ammonia, printed, fixed (for this purpose I prefer ammonia—my reasons I will give some other time) and transferred. From this any number of negatives may be made by the same process and transferred to Parkesine. The objects are—permanance, which I doubt with albumen; the ability to print from either side of the negative, and to stow your negatives away in a book and re-use your glass; making vignetted negatives; giving variety to the background by the careful printing of the transparency. This being done it is done once and for all. So, to the tune of an old "leader" of yours, our art may find some useful "work for Parkesine" to do.

W. E. Batho.

DECORATIVE PAINTING ON CLOTH.

Photographic portraiture will never be able to dispense with the aid of the painter. No matter what scientific appliances may be used, or what perfection of processes, at every turn the hand, eye, and brush of the artist are called into requisition. The accessories to a picture at the time it is taken, and the picture itself at every stage of its progress towards completion, must now be considered mainly in relation to the artistic handiwork bestowed on them. Thus the old dispute as to what is art and what is not in photography solves itself, as such things are apt to do, in an excellent practical fashion; for, whatever photography may be, it is clear that there is no real antagonism between it and the older forms of art. It may have modified and opened new channels for these, but it has in no sense obliterated them.

In this view, therefore, the subject which this paper deals with, and which has been fully gone into in a late number of the *Moniteur de la Photographie*, by M. E. Lacan, is one of much interest to the photographer; for in portraiture, at any rate, the highest form of accessory decoration has yet by no means been reached. Painted backgrounds have become almost a by-word of contempt, it has been so impossible to adapt their perspectives to the requirements of a studio, or to make them fit into the solid objects around them. But there is a kind of decoration perfectly adaptable and legitimate which, were it not for its costliness, might have been much more used than it has been. We allude to decorative designs done on a flat surface and meant to appear as such—a thing quite different from the mock realistic scene painting which has been so long in vogue, and which has been borrowed from the practices in modern theatres, much to the detriment of photography as an art. It is impossible to delude the lens into treating such things as if they were real, for it is an instrument without imagination. We may be carried away by the glitter and illusion of the playhouse, and the eye deceived by the mind, but photography has no such follies. The inappropriateness of these scenic effects for a studio is therefore sufficiently noteworthy, and has often enough excited notice. Not so simple tapestry, sewn or painted work on cloth, meant to be that and nothing else. Here, however, sewn or the finer kinds of loomed work is quite out of the question, and paintings of any quality are just about as costly; and, besides, these done in the ordinary manner would be of little more value than a framed painting. To be useful, and to have at once the power of giving great variety and richness of effect, this kind of painting ought to be as flexible and movable as a curtain.

M. Lacan says that a process of applying colours so as to leave the cloth thus flexible has been discovered of late. It is, according to him, an old art much in vogue up to the fifteenth century, and paintings of that sort took the place of the later-woven tapestries in apartments. Under Henry II. and Louis XIII. and XIV. of France, painting in oil was often used in conjunction with this woven work in decorative furniture and sacerdotal ornaments. Of the process by which this kind of painting was done there remains now no trace, but recently a clever artist has set himself to rediscover it or to invent a new plan. After long effort and many failures he has succeeded. It is well known that the printing of chemical colours on calico in such a manner as to render them almost indelible has long been in use. If you take a piece of cloth of this kind which has been printed with good colours and wash it with soap and water no perceptible difference will be visible, and these colours add nothing to the thickness of the cloth. But it will be different if you put the cloth in the strong sunlight. A short time of such exposure will be found to have materially weakened the brilliancy of the tints. These colours, which stand washing thoroughly, may be said to vanish with exposure to air and light.

On the other hand, chemical reagents which serve for a base of adherence for the colouring matter are apt to attack more or less injuriously the fabrics themselves, and to endanger their stability. Towards the close of the reign of Louis XIV., the secret of painting in oil colours in this way having been lost, the idea was entertained of having recourse to colours prepared with gum for painting and stamping the clothes destined for theatre costumes, and the specimens of eighteenth-century work of this kind prove that this gum, which was esteemed inoffensive, became in a short time a violent corrosive when applied to the tissues. In saying this M. Lacan does not allude to the attempts made to revive the method of wall decoration in colours laid on with glue *(colle de peau)*, and which may be seen exposed to the glare of day in our grand houses. Everyone knows that these colours disappear with the least scratch. Objections may equally be found against attempts to paint with oils in the ordinary way or by means of various spirit varnishes; but these we need not trouble our readers by detailing, they being sufficiently obvious.

The question is—If this process be not any of these, what is it? It is nothing other than printing with fine *encres grasses*—printers' ink. Everyone knows how slight is the deposit which such matter leaves on the surface of any fabric on which it is impressed, and that, so far as is known, the composition does not leave anything injurious in the texture. There is nothing that we can see of the nature of a "discovery" in this fact, for we fancy it was the fashion to print on calico in some such way many years ago. If the cloth be prepared, or the ink of such a consistency as neither to allow of a thick deposit stiffening the cloth or of "running" so as to blur the image, there should be no difficulty in making exceedingly effective decorative designs in colours or otherwise, after this fashion, on cloth. Undoubtedly it would be a very superior plan to that of the present system of scene-painting for photographic accessories, and, by the use of blocks, designs might be multiplied of an exquisite kind at an extremely cheap rate. As M. Lacan points out, it may also admit of effect of colour such as the obsolete process never attained to, and, by means of the mechanical printing related to autotypy, may be made available for reproducing photographs even on cloth and in colours in a way far superior to anything ever before attained. Photographs might then be reproduced of flowers and other natural objects as part of new and beautiful designs for calicos.

The exact modification of this "greasy-ink" printing M. Lacan does not favour his readers by describing; but he states that it has become very much in vogue amongst French architects, and promises to help towards reviving the rich-coloured decorations of art of the last two centuries. There is no doubt that oil-colours of any kind, if they can be applied sufficiently diluted to prevent too much filling of pores and the consequent cracking of the cloth, afford a more permanent means of pictorial art than chemical combinations and acids; but the matter must be as yet too much in its infancy as a method of *colour* printing to enable one to say what it is or how far it may go in this direction. The subject is well worth the consideration of photographers; but we should also like to hear much more definitely what the thing is in its details.

THE PROPOSED BRITISH PHOTOGRAPHIC SOCIETY.

I have reason to believe that a great many photographers share with me the opinion that the time has now come when it will be for the general good to dissolve the unfortunate London Photographic Society, and found in the place of it a new society on better principles, with a higher aim, and under proper management.

Although not a member myself, I have watched the doings of the old Society for about twenty years, have rejoiced in its early success during its palmy days, and have deplored, during the many dark years of its decline, the downfall of the hopes which were at first entertained of it. Its whole history has been familiar to me since I first took up the pen as a contributer to photographic literature, and the causes of its decline have always been so perfectly apparent to me that I have foreseen and predicted that, sooner or later, the indignation of members generally would be aroused and the real governing body be compelled through a vote of censure, or what would be equivalent to it, to resign their seats. This has at length occurred, and the Society is now said to be in a state of revolution. Would it not be better to say at once *dis*solution? Many members think so. Then what would be easier than to divide amongst such members as have really paid their entrance fee and their subscription for the current year whatever balance may remain after the debts of the Society have been cancelled, and declare it dissolved? What that actual balance might be it is not for me to conjecture, but I observe that the arrears of entrance fees and subscribtions due amount to £145 9s., one-fifth of which is to be regarded as a bad debt, while £64 11s. are due for sales of, and advertisements in, the journal! The balance at the bankers amounts to £171 1s. 5d.; and the debts of the Society to £47 10s. 8d. ("about"). Thus, unless the word "about" has a rather loose signification, that half of the members who appear to have paid up their subscription for this year in advance would have a chance of getting it back again in the event of a dissolution.

If we look back to the past history of the Society for the cause of its decline, of its utter uselessness, except to serve the interests of a party who have retained office for a long period of years, and of its present deplorable state, we shall find it readily enough in the long series of "scandals"—if I may be allowed to use a term which has now become common in speaking of failures of administration—which have prevailed ever since that particular party was entrusted with the management of its affairs. This long series, extending over about fourteen years, will be found to include journal scandals, medal scandals, and a debt scandal—enough to sink any society; and if a faint gleam of hope has within the last year or two dawned upon this most unfortunate Society, that may be traced mainly to the influence of a few new men in the Council, whose treatment by their fellow-members has, however, been such that they were compelled, before the recent hubbub, to resign their seats! Does any one doubt the existence of such scandals as those to which I allude? Then he need only look back to what has occurred during the past few months to find enough to satisfy the most greedy appetite for such things.

Did not a jury composed of the Council last year award six out of nine medals to members of its own body? Was not an important question put to the President by a member at a recent ordinary meeting suppressed in the report of that meeting in the Society's journal? and did not the Council oppose, illegally and obstructively, the petition signed by a sufficient number of requisitionists for a reform in the laws, and treat that petition with supercilious contempt? The fact is, if I may be allowed to speak figuratively, the poor Society has been ridden, for a long series of years, like Sinbad the sailor, by an old man of the sea; and now that the old man has been dislodged, the misfortune is that poor Sinbad is so exhausted as to be almost unable to rise again. Then why attempt to raise him? Rather let him die in peace and be respectably interred.

Turn we then to the formation of a new photographic society, under a new name, with a new set of office-bearers, better rules, and a higher aim. In the establishment of such a society a number of different ideas and interests will have to be consulted, and in the multitude of counsellors there may be wisdom. Those who may wish to become members of it should therefore consult together and compare views; and, as I am myself in that position, I will now venture, with our Editors' leave, to offer a few hints for the consideration of others who may be similarly disposed.

Colonel Stuart Wortley has lately suggested a grand scheme which I feel much too timid and cautious to back, although some kind friend has done me the honour to associate my name with his in connection with it, calling it the "Sutton-Wortley" programme of a new society—a name which I beg may be discontinued, as having had its origin in a mistake. My ideas, if less grand than Colonel Wortley's, are, I think, more practical. I am a great believer in the process of gradual development, because I find it to be that which Nature herself employs in elaborating her most perfect and permanent results. It is a sturdy oak, the growth of years in a good soil, and not a gaudy and perishable fungus, the growth of a single night out of a mass of corruption, which we wish the new society in time to resemble. Let us, then, plant carefully a healthy seed, and watch over its growth with proper solicitude, shielding it from all noxious influences, and handing it down to our successors to develope, year by year, into the giant tree. And let us give to this young plant the name which it should always bear and honourably retain—not a local but a national one—and call it the "British Photographic Society."

The *least* which this society ought to attempt at first should be to hold regular meetings, an annual exhibition, and to award medals of progress for inventions and discoveries in the science, the processes, the appliances, and the applications of photography. All this it should make up its mind to do at once; afterwards it may consider whether it may not have premises of its own, built according to its own plan, and combining exhibition rooms with laboratories and a college for instruction in the various branches of photography, &c., according as its funds increase so as to justify the outlay.

I would suggest that the annual subscription be two guineas, and that the first two hundred members who join should be exempt from the payment of an entrance fee. That no arrears of subscriptions be allowed, and that the names of delinquents be posted in the meeting-room, and the privileges of membership denied to them, as is done in yacht clubs and other societies. It should be remembered also that a society is a sort of unlimited company, in which every member is separately responsible for the whole debt which the society may incur—a circumstance which renders it very necessary that debts should be paid in ready money, and that a treasurer's annual report should contain no fabulous estimates of the value of assets to balance against real liabilities. No deception as to the real financial state of the society should be palmed off upon the members, but money matters should be kept square as a primary consideration; whilst surplus funds should always be regarded as a means for the further development of the society's operations in some useful direction.

Meetings should be held, if possible, fortnightly; and the society should supply refreshments to the members present, for nothing commands so good an attendance as this. It is pleasant, after the meeting, to adjourn to the refreshment table and gossip with one's friends whilst sipping one's coffee and eating one's rusk, but singularly unpleasant to have to turn out into London streets on a dark winter's night, upon an empty stomach, and, after a cold drive home at midnight, find the fire out and the servants gone to bed, and nothing comfortable awaiting one; or, perhaps, a late supper, which is certain to give one a headache the next morning. After leaving one's wine and dessert at seven, to attend a meeting which is held probably at a distance of some miles from one's residence, one feels the comfort of a cup of coffee at ten or eleven o'clock, after the meeting, before one sallies forth again on the homeward journey. True, there are supper-rooms in London; but these, I fancy, are not exactly the places which a respectable *paterfamilias* would care to visit.

There should be no long, heavy papers read at the meetings; and these should be managed pretty much after the fashion of those of the Photographic Society of France, where many members contribute each a mite towards a discussion, and bring objects of interest to exhibit. Nothing can be better managed than the meetings of the French Society, and they may be taken as a pattern of what a meeting should be.

A word or two now about what should be avoided by the new society.

In the first place, it should avoid most scrupulously the publication of a journal. Experience has already shown that there is nothing so mischievous and so liable to abuse as this—nothing so exhaustive to the finances of a society, and so certain to produce endless unpleasantness amongst the members in the shape of rivalries, jealousies, &c. If there were no photographic journals in existence, then a photographic society might, perhaps, with propriety start one; but even then, in order to pay its expenses, it would have to be conducted with a great deal of ability and commercial cleverness, and its editor would have a great deal too much power to offend one party in the society and aid another. All this has been proved again and again, and the old Society may trace most of its troubles to its journal, which afforded for a number of years an unfortunate illustration of the evils to which I allude. Let the reader imagine for a moment what would become of the Edinburgh or Manchester Photographic Societies, now so pleasantly conducted, if, instead of sending their proceedings to be reported in this old-established BRITISH JOURNAL OF PHOTOGRAPHY, with its large circulation, penetrating into every corner of the earth where our language is spoken, they were to start a journal of their own! How long would their members pull amicably together, or the society keep out of debt and botheration? I venture to believe—though I have no authority for actually saying so—that THE BRITISH JOURNAL OF PHOTOGRAPHY—the organ of the reform party in the late movement—would lend a portion of its space, with pleasure and free of charge, to a report of the proceedings of the "British Photographic Society," which might be furnished to it by the society's special reporter, and approved by the Council. Surely such an arrangement would be a most happy escape from a difficulty which has done more than anything else to strangle the old Society. Any other mode of publishing its reports would be a foolish waste of its funds, and an act of silly vanity; besides which, by entering into direct rivalry with existing journals, the utility of which has been proved beyond a doubt, the society's journal would do positive harm instead of good.

But it may be objected that the Chemical, Astronomical, Statistical, and other societies publish their own reports, and why should not a leading photographic society do so too? The answer is that such societies as I have named cover in their operations a very wide area of *scientific* research, whilst their proceedings are mainly confined to *scientific* investigations; but such is not the case with a photographic society, where it is the *art* rather than the *science* of photography which receives the attention of members, most of whom cultivate it as a profession, or with a commercial object in view. Thus, in the latter case, commercial interests may clash, while they cannot in the other, and an editor would have a much more difficult part to play. Let us, then, view this matter of the journal with practical common sense, and not be carried away by too grand notions and get ourselves into a mess. If it should be asked what inducement *country* members would have to join, if their only privilege, viz., the receipt of the society's journal, free of charge, were to cease—I reply, what country member would ever be induced to join the society for the mere sake of saving a few shillings annually by obtaining free a report of its proceedings, when he would be sure to find them equally well reported in his "commercial journal," which would also include a mass of other matter? What attractions would the society's journal offer to him under these circumstances? That it would be left uncut and be regarded as so much waste paper has been already proved.

Another thing which a new society ought to avoid is that of placing amongst its list of office-bearers mere ornamental gentlemen with handles to their names, who would take no active interest in its affairs; nor gentlemen who have already proved themselves unfit for holding office by their antecedents in that capacity. I need not enlarge upon this point, for I hope that a delicate hint will suffice. There are now thousands of good practical photographers in every civilised country; surely from amongst such a large class of them as are to be found in England we might select as office-bearers of a new society men whose names are identical with progress—men of good practical sense in business matters, and men who would keep a watchful eye upon all departures from the strict line of honour and gentlemanly conduct.

In concluding, I would venture to offer a remark or two respecting the charge which has been recently brought against the London Photographic Society of having done nothing to encourage scientific research. This may be true; but the same thing is equally true of every other provincial or foreign photographic society. The fact is, the *science* of photography, both in its optics and its chemistry, is a very tough job, and few even of our best men have had the hardihood to tackle it. The course of large pencils of great obliquity through lenses has never yet been analytically investigated, owing to the enormous labour which that would involve, and the problem has been left for solution in any particular case to the practical optician by the readier method of trial and error. As for the chemistry of photography, that seems to involve greater difficulty still, so that practical men have been left to work out practical problems in their own way, unaided, or nearly so, by the suggestions of the scientist. I offer these remarks by way of apology for the London Photographic Society, which can, at anyrate, point to one of its members, Captain Abney, as having read a very able paper last year, at one of the Society's meetings, on a theory of the latent image, supported by many interesting experiments. THOMAS SUTTON, B.A.

Contemporary Press.

LIGHTING FOR PORTRAITS.

[PHOTOGRAPHIC MOSAICS.]

So much has already been written on this subject that a feeling of embarrassment controls me in introducing it again to your readers; but feeling also that herein is the great *need* of the majority of the fraternity, and that it is indeed the *key* to success in portrait photography, I am induced to write a short article under this head.

The whole system of lighting a subject for a photographic portrait is contained in the following sentence:—The light must be properly balanced; the exposure sufficient to bear out the lighting; and the development regulated to the exposure. No one of these three items can be in error without destroying, with mathematical certainty, the *perfect* result. You may *approximate* and produce *good* pictures, but not the *best*. Place a sitter under an uncurtained light, even in the most favourable position possible, and we at once see that one side of the face is in very strong light, and the other in very strong shadow. We can hardly see any detail in the shadow, except we squint the eyes and shut out the volume of light which confuses our vision (as it will also that of the lens), then we see some of the details. Now take a large cardboard and hold it to the side of your face, nearest the direction from which the light comes, and hold it also in such a manner that you see only the shadow side of the sitter's face, and observe how, at the instant the light side of the face is obscured by the interposition of the cardboard, the shadow seems to lighten and become transparent. We perceive at once, from this experiment, that the shaded side of the face is not in the deep shadow it seemed to be, but that the force of contrast caused it to *appear* so; and *practically*, for all purposes of photography, it *is* so, for we cannot make our lenses squint. You will see by this that by balance I mean an even illumination or light, so managed that the contrasts shall not be white and black. There is no pure white on the flesh of the pictures of our best painters, and the high lights of our best photographs are always keyed many tones below white; but, for all this, the shadows are so managed, by being kept transparent and full of detail, that they seem much lighter than they really are.

Now draw your curtains until the proper balance is obtained. By these contrasts, in connection with the position, we may develope or obscure many character-marks in most faces, and in the good judgment used in doing so is shown the true *artist;* for it is a feeling, a thought, a sentiment, a glimpse of the inner man which he is trying to give to his picture, and, unless the heart is interested, the result will be as lifeless as "Mark Twain's mummy." If the light is obtained by curtaining down, and thus gaining balance, the exposure must be full; on the other hand, the same result may be obtained by an exposure of one-third, more or less, under a large light, because stronger illumination may be used without increasing the ratio between the brilliancy of the high lights and proportionate density of the shadows. Under *all* lights the operator cannot obtain this balance by *both* methods; for, if the light is already small, the only way left is by reflection, and by curtaining down an already weak light, and making the exposure very long to get the required details in the shadows. Hence I am partial to large lights, which require less use of the curtains to temper and control them. They give always sufficient diffusion and render possible any degree of strength obtainable by smaller and more direct lights. I think, as a rule, at least three-fourths of the operators in this country expose their plates too short a time in the camera to get the best results. The stronger the contrasts in your lighting the longer must be the exposure of your plate to blend and soften the lights, make transparent shadows, and give fine modelling and middle tint to pictures. It is like the use of a blender to the painter in oils. If used with skill it produces on a too crisp, hard picture an enchanting softness without destroying strength and character; but in unskilful hands the result is insipid and lifeless. Now, in lighting your sitter, remember you hold in your hands an equivalent power equal to the blender of the painter, and try to regulate the exposure of your plate to the degree of strength used in the lighting of the subject. Before you flow the developer over your plate remember all the details of your skylight and camera work, so that at the last moment you may not ruin, by a too strong or too weak development, what otherwise was wellnigh perfect. L. G. BIGELOW.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

The adjourned general meeting of this Society was held on Tuesday evening last,—Mr. Jabez Hughes in the chair.

The Chairman explained that as that was an adjourned meeting, and as he was voted to the chair at the former meeting, he took it again on that occasion merely to continue that general business. At the previous meeting there was much excitement and feeling manifested, under the influence of which certain conclusions had been arrived at which perhaps might not have been the case had they had more time. During the interval which had elapsed since the last meeting time had been allowed for reflection upon the circumstances of the case, and he hoped that much of the strong feeling then displayed had since subsided. He would fain hope that their proceedings on that occasion would be pervaded by a tone of forbearance, and he trusted that conciliation would be adopted as their keynote.

Mr. Frank Howard, acting Secretary, then read the minutes of the previous special meeting.

Major Malcolm proposed that the confirmation of the minutes should be postponed till that day six months. (Laughter.) It would be very desirable if the records of that meeting were consigned to oblivion.

The Chairman said that the speaker was out of order; all that was required in connection with the minutes was an expression of their being a correct statement of the proceedings of the meeting in question.

Major Malcolm considered that there had been at that meeting an attack upon the offices of president and ——

Mr. Greenwood said that the accuracy of the minutes of the last meeting was the only subject before the meeting, and no matter foreign to that should be introduced.

Capt. Abney held that, as certain changes of the laws were recorded, the confirming of the minutes would be equivalent to a third reading of a bill in Parliament.

The Chairman had had the opinion of two Queen's Counsel, and could state that the laws were just as potent whether confirmed in minutes or not; that the minutes of a meeting were merely a brief record, and possessed no legal power in themselves. The only question before them was were the minutes read an accurate statement of what took place at the last meeting.

After some further remarks the meeting confirmed the minutes of the special meeting. The minutes of the annual meeting were then read and confirmed.

The Chairman said that the next business was the election of officers and Council to fill the vacancies created by the resignations which took place at the previous meeting. The gentlemen filling those offices vacated their seats, but, as they were all aware, they did not resign their membership. They had to appoint others that night, but those gentlemen, being members, were certainly as eligible for filling the vacant places as any other members of the Society. The question before the meeting was—*Who* are to be elected? A gentleman was about to propose a list of his fellow-members to fill the offices, and it so occurred that those to be proposed were the very same gentlemen who had vacated them. As individuals nobody whatever objected to the gentlemen who formed the previous Council; the only objection had been to the manner in which they were elected. He suggested that by re-electing those gentlemen they would not only heal the sores and differences that existed in the Society, but they would elect most fitting and able men. The motion about to be proposed by one of their members was to the following effect:—"That the late President and the other officers of the Society who had resigned be elected, and to hold office until the new laws are framed, when a new election shall take place in which all the members of the Society can take part."

Colonel Wortley: May I ask whether the two laws which have been passed do not render necessary that all the members of the Council be elected *de novo?*

The Chairman said it did not apply to the members who were elected upon the last occasion. He then called upon Mr. George Hooper to move the resolution that had been read.

Mr. Hooper had pleasure in doing so. At the last meeting Dr. Mann had been kind enough to say that the vote passed had not been intended as one of a want of confidence, and in furtherance of that idea he (Mr. Hooper) had suggested that they should unanimously re-elect the same members. For the benefit of the Society it was necessary that they should have some common ground for united action. He hoped that all personalities would be avoided, so that their Society might become a real national society of Great Britain. He asked the members present to unanimously vote those gentlemen back, so that they might be brought back with unity and grace.

Dr. Mann seconded the motion with great gratification. They could not have better men at the helm than those who had resigned, and he hoped that they would accede to their wishes.

Mr. Bird supported the motion.

Colonel Wortley proposed, as an amendment, that the Council be formed of a list of gentlemen whose names we could not entirely catch, but who seemed to be composed of those of the old and the present Council residing in London, with the addition of the name of Dr. Diamond.

The Chairman said that Colonel Wortley's list was incorrect in respect to the numbers to be elected, and therefore could not be accepted unless reduced to the proper number.

Colonel Wortley said that the ballot for new members at the last meeting was illegal. He too, as well as their Chairman, had had the opinion of a Queen's Counsel, and neither the Chairman nor any of the Council were legally elected.

The Chairman reminded the last speaker that he (Mr. Hughes) had not been elected to fill any office at all. If the gentlemen then elected had not been recognised it followed that they would have had no executive at all, and the present meeting could not have been called. He could say for the nucleus that had been elected at the previous meeting that they had no desire to retain office, but they had remained in so as to keep the Society together and prevent its being disintegrated.

Mr. Sebastian Davis asked whether Colonel Wortley would inform them upon what grounds the ballot was illegal?

Colonel Wortley said that he had proposed at the December meeting the name of Mr. Jabez Hughes as a member of the Council; but the Secretary, acting on instructions from the Council, had not inserted Mr. Hughes's name in the balloting paper. Even granting that the omission had been made at Mr. Hughes's request, the ballot was thereby rendered inoperative. He (Colonel Wortley) cited in proof of this what had been recently done in connection with a Parliamentary election in Marylebone, where the returning officer had given in the number of votes recorded for a candidate who had withdrawn his candidature.

Mr. Greenwood observed that they were not governed by practices observed at Parliamentary elections, but by their own laws, in the same way as the Carlton and other clubs were governed.

The Chairman then ruled that Colonel Wortley's motion could not be entertained in its present form.

Mr. B. J. Edwards proposed, and Mr. W. J. Stillman seconded, that the members of the former Council be elected *seriatim*, and not *en masse*.

After some conversation, in which Messrs. Sawyer, Tully, Henderson, and others took part, in the course of which the desirableness of electing them as a whole was shown, the motion was withdrawn.

In reply to a question by Mr. Tully,

The Chairman said that the six new members of Council who had been elected at the previous meeting were not to be displaced by the election of the former members of Council. Their position would be unaffected by the vote.

Colonel Wortley proposed Dr. Diamond as a member of the next Council, and asked why that gentleman should receive a slap in the face.

The motion was not seconded.

Mr. Bird said the question was one of policy. The old Council had served the Society during a period of great trouble, and had served it well, and the loss of their services in future would be a serious one. The Council and the members had had just a little "brush," and that being over, they might go on harmoniously together. He strongly advocated the adoption of the motion.

Capt. Abney desired to say that the Council entertained nothing but the most friendly feelings for the members.

The Chairman then put the motion, which, with the exception of a solitary hand, was carried unanimously.

The Chairman said that the Council was then intact. He had next to speak in connection with the gentlemen who had been elected as a nucleus for the Council at the last meeting. As they had been elected under a certain amount of feeling, and as doubts had been thrown by Colonel Wortley upon the legality of the ballot by which they were elected, he begged, in their names, to tender their resignation to the Society—not from any hostility they entertained towards those who had just been elected—not from any desire not to work with those gentlemen, but solely to relieve the members from any difficulty in which they imagined themselves to be placed. Those gentlemen, he said, were all eligible for re-election, and, if elected, would willingly serve again.

Mr. Reid was quite sure that the requisitionists had the best interests of the Society at heart, and it would be paying them a very happy compliment if they were to re-elect *en masse* the gentlemen whose resignations the Chairman had just tendered. He accordingly proposed a resolution to that effect.

Mr. Spiller seconded the motion. He felt gratified at the kindly turn matters had taken. He had not seen the President since their last meeting; but, speaking for himself, he would have much pleasure in acting on the Council as before.

On being put to the meeting the matter was carried unanimously.

On the motion of Dr. Mann, seconded by Mr. Werge, the thanks of the meeting were unanimously voted to Mr. Bird for his services in connection with the financial department of the Society.

Mr. Davis proposed, and Mr. Wenham seconded, a motion to the effect that the silver medal of the Society be presented to Mr. Glaisher for the services he had rendered to the Society during the term of his presidency. Mr. Davis bore testimony to the great value of those services.

The meeting then proceeded to the discussion of the new laws proposed by the committee appointed for revising them; but, owing to the lateness of the hour, and the desirableness of their being still further considered by the committee, that body was re-appointed, with powers to add to their number, and it was arranged that a meeting be held that day fortnight, if the hall could be obtained. Each member would receive due intimation of the meeting.

On the motion of Colonel WORTLEY, seconded by Mr. DAVIS, and carried unanimously, a vote of thanks was awarded to Mr. Hughes for the excellent manner in which he had presided over the present and former meetings.

The proceedings then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 4th inst.,—Mr. R. G. Muir, President, in the chair.

The minutes of the previous meeting were read and approved, and Messrs. D. Dalgliesh, James Allison, George Lisle, J. C. Hay, R. Menzies, Alexander Sutherland, and Thomas Pringle were admitted ordinary members.

Mr. ALEXANDER HENRY said that it was, perhaps, not much in the shape of honour that the Society had to bestow, but he understood that it had, from time to time, done what it could by electing as honorary members those who had made their mark in the annals of photography. He had, therefore, much pleasure in proposing that the name of Captain Horatio Ross, of Wyvis Lodge, Rosshire, be added to the honorary list. The world generally knew something of what Captain Ross could do with his rifle, but photographers knew that he was equally at home with the camera, and that, too, in a line that was, from its difficulty, not often attempted, namely, the photographing of deer in their native haunts. Some of the members had recently had an opportunity of seeing specimens of his work in that department, and he was quite sure that they would agree with him in saying that they were such as would do credit to any photographer. Captain Ross, he said, had been a pioneer in the art. and, while honouring him, the Society would be doing honour to itself in electing him one of its honorary members.

The motion was seconded by the Secretary, Mr. Colin Sinclair, and carried by acclamation.

It was then proposed and carried in the same manner that Mr. John Peat, who had been an active member of the Society from its foundation, and who had removed to London, be elected a corresponding member.

The next business was a discourse on the polarisation of light, with illustrations, by Mr. W. Gilmour and Dr. John Nicol.

Dr. NICOL began by saying that he thought it necessary to apologise to the Society—not for bringing the subject of polarised light before them, because, although he was not as yet prepared to connect it in any way with the practice of photography, no one could say how soon such a connection might be discovered. Photography was gradually passing out of the domain of empiricism into that of an exact science, and whenever the transformation was complete he had no doubt that a knowledge of polarisation, as well as of everything else connected with light, would be found useful. Neither did he need to make an apology for Mr. Gilmour, as they would very soon see that he had not only a stock of apparatus for the production of the most beautiful illustrations, but that he knew very thoroughly how to use it to the best advantage. The apology, therefore, was for himself, and for what he honestly felt was his presumption in coming before them with his very limited knowledge of such an abstruse subject. He, however, felt it due to himself to explain why he had undertaken a duty for which he considered himself unfit. Some months ago he had been at a meeting of the Pharmaceutical Society, at which Mr. Gilmour read a paper on polarised light, accompanied by a series of very fine illustrations, and he thought it would be very desirable to get it repeated to the members of the Edinburgh Photographic Society. When he, however, called on Mr. Gilmour, he found that gentleman's modesty standing in the way; but he (Mr. Gilmour) offered to conduct the experiments on condition that he (Dr. Nicol) would undertake the description. In this way he was led into undertaking the work, not because he thought he could do it properly, but because it seemed the only way by which the very fine illustrations could be seen by the meeting. He then said that the wave or undulatory theory was now almost universally accepted. He (Dr. Nicol) started with a description of what he called a "fundamental principle"—the doubling of the intensity of a wave when two half undulations were evenly superposed, and the interference producing darkness when they met unevenly, in consequence of the trough of the one fitting into the ridge of the other. The spectrum was then placed on the screen, and the principle of refraction explained and illustrated. He then explained the laws of refraction, and called special attention to the fact that, when a ray falls on a plate of glass at an angle of between 56° and 57°, one portion is reflected and another refracted, as at other angles; but at that particular angle, which is the angle of polarisation for glass, the refracted and reflected rays are found to possess different properties, so that if the refracted ray is allowed to fall on another plate at a like angle it will all pass through and none be reflected; and, in like manner, the reflected ray, if sent to a plate at a like angle, will all be reflected and none pass through. If, however, the second plate be turned one quarter of a circle, and the same angle be maintained, then the reflected ray will be refracted, and *vice versâ*. This, Dr. Nicol explained, was polarised light, and the phenomena was accounted for by supposing that the undulations were propagated in various directions or planes—say in horizontal and perpendicular. When the undulations fell on a plate of glass those that were in the plane of the structure of the plate passed through, while those that were at right angles were reflected. In this way the refracted waves, being in one plane, would pass through the second plate if its structure were parallel to the first, and be reflected if it stood at right angles. After describing the construction of the lantern polariscope he went on to show that certain crystals which were of unequal density possessed the power of double refraction, or of separation of the light into two planes of polarisation, and illustrated it with a rhomb of Iceland spar, which separated the rays into two discs on the screen; and when the discs were caused to partially overlap each other, and a plate of selenite introduced, the composition of white light by a colour and its complementary was beautifully shown. After showing tourmaline and several other natural, doubly-refracting crystals, he explained that doubly-refracting properties could be artificially given to glass by heat, pressure, &c., which was also very successfully shown by Mr. Gilmour. He next called attention to the colours of the soap-bubble, and explained that they were caused by the reflections from the outer and inner surfaces of the exceedingly thin medium meeting at such positions as that the green and violet should by interference produce darkness, while the red should be doubled, and so on with all the rays. In this way, he continued, when a plate of selenite is interposed between the polariser and analyser, by its doubly-refracting power it bifurcates the polarised ray, which in passing through the latter is split up into the three coloured undulations of which it is composed, two of which by interference, from the cause previously explained, neutralise each other, letting the third appear as coloured light. The interference rays are changed at each quarter of a revolution of the analyser, and so the change of colour is produced.

Mr. Gilmour then introduced a series of unannealed glasses with fine effect, followed by a number of slides of crystals of morphia, salicine, borax, &c., and finished with some selenite plates, cut so as to represent roses, tulips, pansies, &c., &c., which elicited much admiration.

Mr. Turnbull then re-introduced his improved lamp for the lantern or sciopticon, and showed that he had overcome the objectionable dark line on the screen. The lamp, as will be remembered from the report of the last meeting of the Society, contained three wicks, and gave a decidedly brighter disc than that supplied with the sciopticon, while the dark line complained of then was altogether wanting when the lamp was slightly angled.

Votes of thanks were given to Messrs. Gilmour and Turnbull and to Dr. Nicol, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

AT a meeting of this Society, held December, 1873, Dr. E. Hornig occupied the chair, and reported regarding the constitution of the commission for awarding the Voigtlander prizes. After some further preliminary matters had been despatched,

Herr VICTOR ANGERER read a paper demonstrating his method of working dry plates. He employed the coffee process, and dwelt, amongst other things, on the help which dry plates gave in photographing badly-lighted interiors, their only disadvantage being in their requiring such lengthened exposures. He concluded by exhibiting his apparatus and mode of working. Amongst other things he showed a camera made for out-door work, by Mr. George Hare, of London, after Mr. Stillman's plan, and dwelt upon its extreme handiness and adaptability to any size of plate. He concluded by recommending his friends to try the emulsion process.

A discussion then arose upon the advisability of using gas stoves in studios, and it was decided that, upon the whole, they were to be recommended, "especially in such studios as had no suitable chimney for a stove of any other kind."

The CHAIRMAN remarked that the use of gas stoves was attended with various dangers. A puff of air might blow out the flame and fill the room with gas, or the fumes of it when burning might escape through the workrooms and prove most deleterious. In England, he thought, they used in drying-rooms, laboratories, and studios a specially-constructed stove, by which all noxious vapour was carried clean away and only heated air allowed to circulate, and he evidently thought that much the better system.

This closed the business of the evening, and the meeting was adjourned.

ANOTHER meeting of the same Society was held in January, 1874,—Dr. E. Hornig in the chair.

After the minutes had been confirmed,

The CHAIRMAN called upon the Imperial Counsellor, Herr C. Martin, to speak, that gentleman having come to return thanks for the address voted to him in consideration of the help he had been to the Society. Subsequently sundry new members were admitted, amongst others four honorary, viz., Dr. Vogel, of Berlin; M. Davanne, of Paris; Herr Ludwig Angerer, of Vienna; and Mr. H. P. Robinson, of Tunbridge Wells.

Opportunity was taken, in reading the yearly report, which showed the favourable position of the Society, to thank all and sundry who had been helpful to the interests of photography during the arduous time of last year's exhibition.

The CHAIRMAN said that but for the kindly help of everybody the work must have overwhelmed him; and he concluded with the hope that in future he might be able to issue the organ of the Society with greater regularity than had been the case last year.

This complimenting over—finally, let us hope, for some time—the meeting proceeded to business.

Herr Carl Haack gave some account of the preparations which had been made by the German expedition for observing the transit of Venus in Schwerin. It had been determined to use albumen dry plates, on account of their great keeping qualities, and so that a considerable number of negatives of the same phases of the eclipse might be obtained at once. A special exposing shutter had been devised, which was perfectly under control, and which enabled the exposure to be regulated at will. The laboratory was made of iron, and could be warmed.

Herr Fritz Luckhardt exhibited a very useful and durable sort of plate-cleaner, which differed from the ordinary cleaning balls in that it consisted of layers of wash-leather placed vertically, so that their edges formed the cleaning surface. As soon as this surface got dirty it was only necessary to rasp it down until the dirty edges were scraped away. Of course the pad must be very firmly packed.

This concluded the more important business of the meeting, which was shortly after adjourned.

Correspondence.

THE NEW FRENCH PROCESS OF COLOURING PAPER PORTRAITS IN OIL, AND MR. DUPPA'S PATENT FOR THE SAME.

THERE is a new process of colouring paper photographs in oil—or, it may be, an old process revived—which is just now beginning to excite a great deal of attention in France, and our Editors seem to have alluded to it in their article entitled *Photo-Oleography*, at page 96. The inventor of this process is said to be a M. Herbert; there is also a M. Pettit connected with it in some way; and M. Curette, of the Rue d'Enghien, Paris, is agent for the sale of the secret, accompanied by all the necessary requirements for use, and his travellers are now making a tour amongst the provincial photographic studios. The price asked for the secret, together with the necessary lessons, box of colours, brushes, and other requisites, is 300 francs (£12).

Although I have not paid the above sum to learn the wonderful secret—for even if I had I must have taken a pledge not to divulge it—yet I think I can give the reader a pretty good idea of what the process is, what is its true origin, and also who is its true inventor. I can also give the results of my own experiments in this direction, which have been rather numerous of late, and not altogether unsuccessful.

Our Editors, in the article just referred to, have, I think, given a very shrewd guess as to the *modus operandi* by saying that it consists in first making the paper print transparent with wax, varnish, balsam, or oil, then painting it in oil colours upon the back, and, lastly, retouching it in transparent oil colours upon the front; in fact, there is not a doubt that this is the plan pursued. But, unfortunately for M. Herbert's claim to the discovery, the process is not new, having been patented in England about twenty years ago by Mr. Bryan Edward Duppa, of Malmaynes Hall, in the county of Kent, gentleman, the provisional specification having been left by him at the office of the Commissioners of Patents, with his petition, on November 3rd, 1853. Moreover, I strongly suspect that some remarks of mine, made in a letter to this Journal a few weeks ago, on the subject of a new method of colouring photographic portraits without hiding their details, followed shortly after by some hints from our "Peripatetic" friend, may have incited some readers of this Journal in France to make experiments in this direction. Be that as it may, the process is not new; but, like many other valuable things that have been introduced at the wrong time and then buried in oblivion, it has experienced a resurrection, and is now, I think, likely to become a branch of a new and comprehensive system of applying colour to photographs, which will have the effect of introducing quite a new fashion in photographic portraiture, and of giving a fresh impetus to the operations of professionals, for there is nothing which will please the public more than a successfully-coloured portrait in which the details of the photograph are not hid, nor the likeness tampered with.

I will now describe the means which I have myself found the most suitable for colouring views and portraits upon paper in the style alluded to, premising that Mr. Duppa's process is a very imperfect one comparatively, and left with the usual vagueness of a patent which includes too much and states nothing with precision. But let us hear what he says first. I will quote from his completed specification, which is now before me. He says:—

"A photographic picture having been obtained on suitable material in the usual manner * * * by my invention, the colour is applied to the back, * * * so that the colours are behind the picture, and are seen through the material on which it is taken, the material for that purpose being transparent. Although I believe that paper is the best material, I do not confine myself thereto. An image having been obtained on paper in the usual manner, a coating of wax, varnish, or similar material is applied to the front surface thereof, in order to render the same transparent. For this purpose I prefer melted wax or mastic varnish. * * * I next apply the colours to the back of the picture, and for this purpose I prefer to employ oil colours, though others may be used. * * * The colours having been applied as above explained, I cement the back of the picture to a surface of cardboard or other material, and for this purpose I prefer to use white lead spread over the cardboard or other surface; and, finally, I again varnish the front of the picture, if required, to bring all parts well out."

The gaps which I have left in the above are merely verbiage, which it was not necessary to repeat.

Such is M. Duppa's process, and my modification of it is as follows:—The print should be made in the usual way upon very thin paper, which may be either plain or albumenised. Plain paper prints, toned to a full black in the gold bath, are, I think, the best. They are to be made transparent by brushing them over upon the back (not the face) with a mixture of equal parts of colourless linseed oil and essence of petrol.* The oil should be as colourless as water, and the essence such as is used in sponge lamps. The print is then to be fastened by its edges to a sheet of glass, for the sake of convenience, and painted in oil colours upon the back, the colours being diluted slightly with essence of petrol. They are the common tube colours, and are squeezed out upon a palette, and applied in the usual way with a camel's-hair brush. They must be opaque colours, and not transparent ones, and never darker than the lights of the picture, since the shadows of the photograph, seen against a light ground, give the shadows of the picture. They may be laid on in simple broad patches, like colouring a map. When dry the painted print must be removed from the glass and mounted with glue either upon cardboard, panel, or canvas. The next operation will be to varnish and retouch it with transparent colour upon the front; but opaque colours may also be used in places where it is advisable to hide or modify objectionable details. I prefer sun prints upon plain paper, because the whites are better preserved, and there is less risk of fading.

The process is an admirable one for enlarged portraits, or portraits not smaller than whole-plate. For portraits of *carte* or cabinet size there is a better and a singularly-beautiful process which I will describe another time, and which, I think, cannot fail to be immensely popular. It seems to me to leave nothing to desire, and to be incapable of any further improvement of importance to the end of time. Nothing will stand against it—not even coloured photo-enamels. It will be the high-class photographic portrait of the future; and, what is more, it cannot be patented or any restriction whatever be laid upon the use of it. The results are of unsurpassable delicacy and beauty, and absolutely permanent.

I will conclude with calling the attention of my readers to the method now employed by secret process-mongers of making money, and with warning them against giving it encouragement. The plan is first to get up some half-dozen fine specimens; these are shown as the ordinary results of the process, which is to be taught for a certain sum, on the condition of the purchaser binding himself to keep the secret. Be on your guard, kind reader, and never become the dupe of any such commercial dodge as this. Either a process is new and can be safely patented, or it is not. If it be really new and good, try a license by all means; but, if not new, do not pay your money to learn what is no secret, and at the same time consent to become gagged respecting it.

Redon, March 6, 1874. THOMAS SUTTON, B.A.

* This spirit is commonly known in this country as "benzoline."—EDS.

THE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—I beg leave to thank you for your courtesy in inserting my letter, as well as for the observations you have been so good as to append to it.

I am glad to learn that the "outs" (now the "ins," as I perceive), whom you term "reformers," contemplate something beyond a mere change of bye-laws and the substitution of one name for another of the same sort on the Council, and that they have in view the giving the Society a broader basis of action than hitherto. I regret that in this respect I should have done them an injustice; but I hope I may be pardoned for having done so, inasmuch as in no document, letter, or speech, official or unofficial, which has appeared in your Journal, or in that of the Society, or anywhere else that I know of, has any other object than the mere alteration of the bye-laws been put forth. Any other object has hitherto been a well-kept secret.—I am, yours, &c.,

Rue de Namur, Brussels, March 6, 1874. James Onslow.

P.S.—You express surprise that anyone in this city should take an interest in, and be well acquainted with, the Society and its proceedings. The fact is, I am an old and enthusiastic photographer, dating back to the times of Daguerre and Fox Talbot. I read with much interest all the photographic journals of the day—whether English, French, Italian, or American—and, with the list of the members before me, am tolerably well up in what is going on. I ride my hobby hard. When in England, too, I take the opportunity of attending your meetings and seeing your exhibitions. I am thus familiar with the works and with the faces of most of your photographic celebrities.—J. O.

BRONZE SPOTS.

To the Editors.

Gentlemen,—I observe in your issue of the 6th ult. a discussion in one of the continental societies concerning the spotting of photographic prints—a complaint but too frequent. One gentleman suggests, if not the cause of this evil, at least the remedy, viz., drying the cards as soon after mounting as possible. This cure has in my hands proved to be but very temporary, and serving only to postpone the appearance of the spots till the cards have left the photographer's hands, the slightest exposure to damp, at any subsequent date, producing the complaint with the utmost certainty.

I am informed the affair is not new, and that the cause is well known; but I can hardly imagine it to be sufficiently well known, owing to the constant recurrence of the complaint. I therefore take this opportunity of repeating the advice—Do not use cards which have been dusted with bronze powder and described as "printed in gold." Minute particles of this powder adhere all over on both sides of the cards, and produce the spots upon the least exposure to damp—an evil, at least up here in my quarters, not to be avoided.—I am, yours, &c.,

Kirkwall, Orkney, March 2, 1874. John B. Russell.

EXCHANGE COLUMN.

A set of scales and weights, in beautiful mahogany box, by Ross, will be given in exchange for glass bath, mounted in mahogany, to take 12 × 10 plates.—E. Horrobine, Skipton.

I will exchange a Ross's stereo. compound lens for portraits (acts instantaneously) with camera and tripod, bath in case, for Dallmeyer's "rapid rectilinear, 7½ back focus, or for a good bellows camera 10 × 8.—Address, Maurice O'Conor, Cahirdaniel, Cahireiveen, Kerry, Ireland.

A lantern with 5-inch condenser, suitable for photographic or exhibition purposes, complete with requirements for oil, oxycalcium, or oxyhydrogen lights, slides, &c., will be exchanged for cabinet lens, doublet for 12 × 10, or 8 × 6 wide-angle doublet.—Address, S. S. Crewdson, Union-street, Ulverston.

A pair of lanterns with dissolving-view arrangement, three-inch condensers, lamps, lenses, sheet, a number of first-class painted slides, the whole fitting in strong box, with metal top and fittings for exhibiting, will be given in exchange for stereoscopic camera and lenses and dry-plate slides; or for small tourist's camera and lens.—Address, S. N. White, Talbot Lodge, Reading.

A good 8½ by 5 Kinnear camera, with one single and three double backs, in leather knapsack, also a good 8½ by 5 leather bellows-body camera, with three double backs, rack-and-pinion movement, and a pair of Lerebours' stereo. lenses with instantaneous shutter, are offered in exchange for a pair of stereo. lenses by one of the best makers, a good card lens, or posing chair.—Address, D. M. Garside, 22, Victoria-street, Manchester.

ANSWERS TO CORRESPONDENTS.

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

Photographs Registered.—

W. Vick, Ipswich—*Four Portraits of J. P. Cobbold, Esq., M.P.*

J. Horsburgh, Edinburgh—*Photograph of Baroness Burdett Coutts.*

W. Murray, Glasgow—*Photograph entitled " The God of the Period."*

H. B. Berkeley.—In our next.

An Old Photographer.—Mr. Delf has been dead several years.

High Street (No. 3), Wainfleet.—There was no signature to your letter.

Rev. Walter Whiting.—We thank our correspondent for an excellent carbon print of Mr. Mungo Ponton.

Cadmus.—The triplet you mention is a very good and serviceable lens, and so far as we know, will answer your purpose well.

Geo. S. Ashford.—The lens employed by you is of too short a focus to produce a satisfactory picture on a twelve-inch plate. Select one of three inches longer focus.

F. J. Leigh.—Let the silver bath be as nearly neutral as possible; and for the very best class of work use a bath that has not been much worked previously. In copying an engraving see that the light is strong and well diffused, for in a well-diffused light the texture of the paper will not be shown.

W. S. H.—1. There is no collodion specially prepared for the gum-gallic process, and a very great degree of latitude may be taken in the selection of a collodion for it.—2. Gum-gallic plates are not injured during preparation by a moderate warmth, but spontaneous drying is always to be preferred.

H. R. H. (Brigade Depot).—The thinness is caused by the developer carrying away the silver from the place at which it is applied. The remedy consists in pouring it neatly along the edge so as to cover the whole surface in an evenly advancing flood; then giving the plate a slight inclination, so as to ensure the near margin being covered with some of the developer which has become mixed with the silver.

Pellicle.—Either of the two descriptions of press in common use—the lithographic and typographic—will answer for photocollotypic printing, but the latter is generally preferred. There are several firms in London—among them Hughes and Kimber—who supply lithographic ink as well as presses suitable for your purpose. The ink must be of an exceptionally fine quality, and not be opaque. The specimen enclosed indicates progress.

John E. G. Ford.—A studio constructed according to the plans sent will answer very well. The only suggestion we have to offer is to place the dark room at the other side of the door—that is, against the brick wall and just at the left-hand side of the door. You could then work from both ends of the studio, which is frequently very desirable. The dark room ought to be somewhat longer than is shown in the plan; for as at present proposed it would be too confined for comfortable working.

N. G.—Crystal varnish usually consists of a solution of dammar and Canadian balsam in benzole. It possesses one advantage, and one only, over alcoholic varnish, viz., it may be applied to a cold negative and will dry bright; whereas, when spirit varnishes are used, the plate must be rendered warm to prevent chilling. You have been correctly informed that a spirit varnish may be made which can be applied to a negative immediately after it is washed and before the water has been dried off. We have both used and made varnish possessing this property.

Geo. Barker.—In our estimation there is no comparison between the refracting and reflecting stereoscopes. The former is convenient and small; the latter cumbrous and inconvenient. Larger pictures may be exhibited in the reflecting than in the refracting stereoscope, but they do not appear to be so large when examined, because lenses possessing a high degree of magnifying power may be used in the lenticular instrument, but this cannot be done in the other; hence the advantage of the smaller instrument as respects magnifying power. There is a further advantage: the pictures for the reflecting stereoscope are not connected, but have to be inserted singly, each one in its proper place, entailing a certain amount of adjustment; whereas the pictures for the refracting stereoscope are mounted side by side upon one card, or, in the case of transparencies, are printed upon one plate of glass, and thus cannot be dissevered.

Medicus.—This correspondent is desirous of making prints upon plain paper with a view to trying the production of pictures in the kind of relief we recently described, and he asks us to supply a formula for the preparation of a good smooth description of paper, similar to a specimen enclosed in his communication. He may proceed as follows:—Dissolve two hundred grains of chloride of sodium in a pint of water and pour the solution into a flat dish. Having selected the best surface of the sheet of paper, mark it with a pencil and float it upon the salting solution for a minute; then hang it upon a line to dry. It is sensitised by being floated upon a sixty-grain solution of nitrate of silver. Paper prepared with ammonia-nitrate of silver is preferred by some on account of its greater sensitiveness; but paper intended to be excited by this agent should not be quite so strongly salted as directed for the simple nitrate of silver bath. Ammonia-nitrate of silver is prepared by making a sixty-grain solution of nitrate of silver, and adding to it, drop by drop, strong ammonia, by which a copious precipitate will be formed. Continue the addition of the ammonia until the precipitate is dissolved, taking care to add no more than is barely sufficient to effect the solution.

The Gum-Gallic Process.—In our recent notice of Captain Abney's manual of *Instruction in Photography* we referred to the gum-gallic process, and spoke of the superior advantages to be derived from employing a strong alkaline pyrogallic developer rather than the one given by Captain Abney. It is only right we should state that, on a further perusal of this excellent manual, we find that the author does refer to the value of this kind of developer when applied to gum-gallic plates; but as the reference is made under a different heading, that of *Uranium Dry Plates*, we had overlooked it.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 724. Vol. XXI.—MARCH 20 1874.

ON THE MEASUREMENT OF THE CHEMICAL ACTION OF LIGHT.

M. E. Marchand, in the *Journal de Pharmacie et de Chimie*, reopens this important subject. His researches are not particularly original; in fact, he seems to base his method of measuring the chemical intensity of light on processes which are well known to those who have worked upon this subject before. There are, however, a few improvements in his method which tend, at any rate, to facilitate the manipulation, and it is our intention, in a future article, to show how the *modus operandi* could be still further simplified. In the meantime we will glance over the several processes already proposed by workers in this direction.

The most important method of measuring the chemical intensity of light, and the one best known, is the process known as "Bunsen and Roscoe's." This process was originally invented by Professor Draper, of New York, and may be said to have been merely perfected by the above-named experimenters. Bunsen's apparatus, no doubt, gives much greater accuracy than could be attained in Draper's primitive experiments, which might be almost termed "suggestions." The process is based upon the affinity existing between the gaseous elements, hydrogen and chlorine, when exposed to actinic influence.

$$\text{Thus:—}\quad \underset{\text{Hydrogen.}}{H} + \underset{\text{Chlorine.}}{Cl} = \underset{\text{Hydrochloric acid.}}{HCl}$$

The two gases are evolved, in the first place, by the electrolysis of hydrochloric acid, and remain uncombined as long as they are not exposed to the influence of the chemical rays. If such a mixture be suddenly submitted to a light particularly rich in the the violet rays an explosion takes place, indicating the combination of these elements; but this reaction goes on gradually in the instrument as invented by Messrs. Bunsen and Roscoe, and, as the resulting hydrochloric acid is dissolved in the water, the diminution in the volume of the gases becomes a measure of the chemical energy in the light under examination.

The process thus invented by Draper, of New York, and elaborated by Bunsen and Roscoe, is the one we have been accustomed to look up to as the most valuable and trustworthy. It is this process, however, that M. Marchand has lately taken exception to. It is, in his opinion, a method tending to exaggeration, "since," he says, "the work accomplished in this reaction is far greater than the total heat force of the rays." It is not our intention to go into the merits of this physical question here, but to describe M. Marchand's process.

Professor John Draper, of New York, made the observation that a solution of peroxalate of iron when exposed to the sunlight was decomposed, that carbonic anhydride was evolved, and that a lemon-coloured protoxalate was precipitated. He expressed it in the following manner:—

$$\underset{\text{Two equivalents of peroxalate of iron.}}{Fe_2\,3C_2\,O_4} = \underset{\text{Two equivalents of protoxalate of iron.}}{2\,Fe\,C_2\,O_4} + \underset{\text{Carbonic anhydride.}}{2\,C\,O_2}$$

It is evident that each equivalent of carbonic anhydride evolved in the form of gas, or each iron equivalent reduced from its ferric to its ferrous salt, represents the actinic influence of the light in as certain and unvarying a form as the combining equivalent of the elements themselves, providing all disturbing causes can be eliminated. The originator of this plan proposed that the measuring should be performed by the reducing action of this solution upon a salt of gold, or by measuring the volume of the carbonic anhydride evolved over mercury.

A namesake of the above experimenter, Mr. H. Draper, of Dublin, in 1859, followed up the above investigations, and effected a considerable improvement in the process. He prepared a standard solution by dissolving moist peroxide of iron in oxalic acid, and this solution was submitted to the action of the light in a small cistern made of glass, which held about 600 grains of water. The cistern was rendered opaque by japanning, and the light was admitted through a space one inch square. In the centre of this plate was a small hole for the escape of the evolved carbonic acid. The whole was then covered with a small glass shade; 500 grains of the standard solution of peroxalate were then placed in this apparatus, and the whole accurately weighed. After being submitted to the light for the arbitrary time fixed upon it was re-weighed, and the loss in weight indicated the amount of decomposition.

We should mention that the excess of carbonic anhydride is carried out of the solution by passing a stream of hydrogen gas through the liquid, and any loss in evaporation of the standard solution is compensated for by a determination carried on with pure water in a similar apparatus and under similar circumstances.

The weak points of the above process are, of course, this last evaporation, and, also, the great change that would be produced in the chemical energy of the rays in passing through two glass media. This would be probably remedied by dispensing with the glass shade, and by covering the inch space through which the light enters by a thin quartz plate, the transparency of glass to the chemical rays being to quartz as 20 is to 74. We should prefer adding to the orifice through which the carbonic anhydride passes a small chloride of calcium tube, through which any moisture carried off with the gas would be retained in consequence of the great affinity which that salt possesses for water.

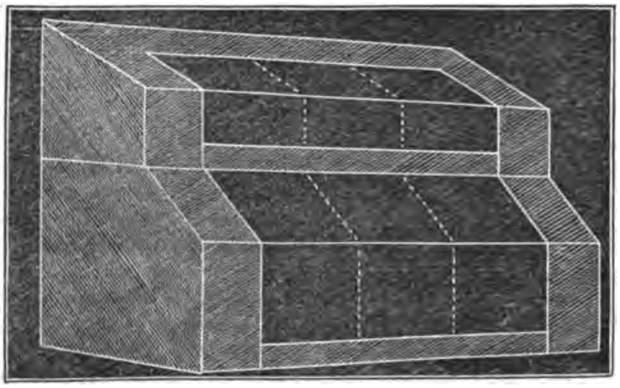
M. Marchand's method is essentially that of Mr. H. Draper's with some slight modifications and improvements. We intend to reserve our remarks upon that gentleman's work for a future article, as we have instituted some experiments in connection therewith.

THE REGINA HOUSE STUDIO.

At the last meeting of the South London Photographic Society, in the course of a desultory conversation on studios (induced by a short paper by Mr. Fry, in which he described his own studio at Kingston-on-Thames), Mr. Valentine Blanchard directed special attention to what he considered the model studio erected in Ryde by Mr. Jabez Hughes.

Believing, at the commencement of the photographic season, that photographers are eagerly on the look-out for hints by which their mode of lighting may be improved, we think it well to present a somewhat detailed account of Mr. Hughes's studio, which was erected some years since, and which, we may state, has fulfilled the expectations of its originator and architect so well that if he had to erect another he would not make any *important* deviations from the plans originally laid down.

The studio is a double one—that is to say, there is a second studio erected on the top of that which forms the principal one. The latter is on the ground floor, the large door-windows of which open into a garden. Its length is thirty-five feet, its width being eighteen feet. Hence, apart from the power of taking single figures, a large group may easily be arranged in such a space. The diagram shows a view of both studios, the one above the other.



The upper studio is 8 feet to eaves, 16 feet from floor to top (at back), and 12 feet wide.
The lower studio is 10 feet to eaves, 16 feet high, 18 feet wide, and 36 feet long. Solid at *each* end 6 feet. Glass in sides of studios reaches to within four feet of floor.

From this it will be seen that the studio on the ground floor, the windows of which face the north, is completely protected from the sun between the hours of six in the morning and six in the evening; for, no matter what the pitch of the roof may be, the sun's rays can have no ingress in consequence of the second or upper studio. The panes of glass throughout are very large, varying from seven feet four inches long by six feet wide to seven feet two by two feet three inches. The large dimensions of these panes prevent a great loss of light from astrigals. As the side of the studio is open to the north the light is obviously of a reliable character. The glass in the roof was originally Hartley's green ribbed glass. Thinking an improvement might be made this glass was removed and plain glass substituted, with a considerable addition to the energy of the light, which, however, was kept under control by blinds. The description of glass substituted was British plate, in three panes of about eight feet square. The slope or pitch of the roof is such as to prevent soot or snow remaining upon it after the cleansing action of the first shower.

In the upper studio one-half of the sloped roof only is glazed, and the sashes are so constructed that they may be drawn up entirely under the unglazed portion, securing a pure top light from the sky, unbroken by transmission through glass. Something akin to this exists in the lower studio, for the side lights are ten feet high. These are suspended by guide wheels on a strong iron bar, and with a guiding rail at the bottom can be slided open, leaving the pure air and light free access into the studio. In the strict sense of the word these are not "glass-rooms" at all; they are constructed of solid masonry, and are supplied with glass windows and doors only just at those portions where the light is required for taking the portraits.

Mr. Hughes's idea seems to have been to exclude glass wherever it could be dispensed with, and where it was really necessary to introduce all the glass he could by using very large panes. Not only are astragals and sash-bars removed, which exclude the light where it is most wanted, but a greatly-diminished risk of leakage is also secured. Every photographer is aware of the nuisance of a leaky roof, and of the difficulty of preventing the ingress of rain. Not only are carpets and furniture spoiled, the backgrounds have mysterious rivulets depicted on them, and the blinds become maps of unknown countries, as a South London member facetiously remarked, but even the sitter is often disturbed when undergoing the solemn ordeal by receiving "a drop too much."

Mr. Hughes has taken unusual pains to avoid this nuisance—first, by the use of very large panes of glass, thus leaving as few joints as possible; next, by having the panes the whole length of the window, so as to avoid another trouble, the "overlaps," which not only exclude light but also introduce dirt, and are a fertile cause, by capillary attraction, of introducing rain and causing leakage. Where the window-bars are necessary Mr. Hughes has them very strong to carry the large panes, and, in addition to having the glass carefully put in with putty, he has also, on the *outside*, slips of wood made which fit close on to the puttied panes. These slips are carefully put on with abundance of white lead, so as to prevent the putty from shrinking in dry weather. To make assurance doubly sure these wooden covers for the joints are secured with *brass* screws, so that from time to time the wooden slips can be easily removed (iron screws would rust with the weather), and with paint, putty, and white lead be made good. We recommend a thoughtful consideration of these minor, but really useful and practical, hints to those who are annoyed with that photographic trouble—a leaky roof.

At its first statement it seems almost an impracticable idea to place one studio over the other, seeing that the top light, usually the chief reliance of the photographer, must be excluded from the lower building. But by a reference to the diagram it will be seen that this is quite practicable if the upper one be made so much smaller that the one under may, so to speak, budge out sufficiently that a certain amount of top light can be secured. It is by no means necessary that *all* the top of a studio should be made of glass; for, if it be made sufficiently high, the side light becomes a top light. Mr. Hughes's studio is sixteen feet high, and as the portion of the lower studio projects six feet beyond the upper one it will be readily seen that the method is not only practical but is also a great economy of space, as well as a perfect security from the midday sun shining into the lower one.

It was mentioned by Mr. Hughes at the meeting of the South London Photographic Society that at one time he removed the Hartley's rolled green glass in the roof of his lower studio and introduced very large sheets of British plate glass. An accidental breakage of one of these sheets, after being some two years in its position, caused the fact to be noticed that the glass had materially changed its colour, and from being originally of a bluish-green had become a decided yellow. This induced him to have it all removed, and he has replaced it by the Hartley glass again, which latter he has found to improve by time, and to become sensibly whiter. The ribbed character of this glass gives a soft diffused light which obviates the necessity for blinds overhead.

No better testimony can be given as to the sound principle on which this studio, or these studios, are built than that they should call forth the generous envy of that master of photographic lighting, Mr. Valentine Blanchard.

TRANSPARENT PAPER: ITS PREPARATION AND USES.

Is there any chance of photographers being ultimately delivered from the necessity of using glass as a medium upon which to produce their negatives?

The convenience of paper of a light, flexible material when compared with glass does not demand a moment's consideration. The desirableness of such a substitute will be universally admitted, provided it answers the purpose as well as the exceedingly inconvenient material for which it is proposed as a substitute. It is by the landscapist rather than by the portrait photographer that the boon of paper instead of glass will be adequately appreciated; for, apart from other considerations, the mere question of weight alone, arising from the difference between the ponderousness of a dozen 12 × 10 plates and the same number of thin sheets of paper, is one which must *weigh* with the peripatetic photographer, who, whether he work wet or dry, must, at any rate, carry with him a glass plate for each negative he purposes taking home.

In conjunction with others we have recently bestowed a great deal of consideration upon the possibility of substituting paper for glass in certain dry processes, but more particularly in that process which is so fast becoming a successful claimant for popular favour—the gelatino-bromide process.

Now, in coating a sheet of paper with sensitive gelatine, the case is not at all similar to that of coating paper with an iodised film, either of collodion or gelatine, which has to be rendered sensitive by subsequent immersion in or floating upon a solution of nitrate of silver. In the former case there is no chemical present which will become entangled in or act upon the fibre of the paper; indeed, the paper and the sensitive preparation will stand to each other in the relation of perfectly inert bodies.

Assuming that paper answers equally well as glass as a support for the sensitive gelatine, the question arises—In what condition ought the paper to be when the sensitive coating is applied to it? Other things being equal, the transparency of glass gives it a great advantage over the semi-opacity of paper—a semi-opacity which conduces not only to slowness in the printing, but to a certain amount of granularity in the definition. Now, these very faults were discovered long ago, in the days when all negatives were taken on paper by the calotype process, and they were sought to be obviated by varnishing the paper, so as to render it as translucent as possible, wax having been the agent used for the purpose. Sometimes the negative was first taken (on plain paper), and then rendered semi-transparent by waxing it; but, in the majority of cases, the paper was rendered translucent first of all, before it was rendered sensitive. Let us borrow an idea from those who have gone before.

We have taken two negatives—one upon plain and the other upon translucent paper. The supporting material of the latter has been semi-transparent from the beginning; the former has only been rendered so after the picture was finished. What is of importance to be noticed is that one is quite as good as the other; hence we may here state that, so far as the rendering of a sheet of paper transparent is concerned, it may be done quite as effectively after a negative film is attached to it as before.

The next matter for consideration is the best means of rendering the paper transparent. We may here state that, after selecting several kinds of tissue paper for experiment, we eventually discarded them in favour of a rather common-looking, thin quality of printing paper. Whatever be the class of paper it must be "wove," not "laid." Almond oil, so long ago recommended by the late Mr. Blair, forms a most excellent means of making paper transparent; all its fibre disappears to a considerable extent, and the paper when dry is very little discoloured. But a very serious objection to its use is found in the great length of time that is required for its becoming dry. We cannot say what the experience of others may have been, but in our hands paper varnished or impregnated with almond oil was not thoroughly dry at the end of the eighth day after preparation. As almond oil dissolves both in ether and alcohol, it might be worth while applying a solution of it in one of these menstrua to paper. In trying experiments with this oil care should be taken to obtain it pure, for it is extensively adulterated with nut, poppy, and colza oils.

New and colourless linseed oil answers far better; the paper is by it rendered quite translucent and dries in two or three days. The kind of linseed oil here referred to is the raw, not the boiled, oil. There are two kinds of raw linseed oil; that known as the "cold drawn" is the best. It is pale in colour, and is viscous. We have heard nut oil well spoken of as a means of rendering paper translucent, but have not tried it. Castor oil is objectionable on account of its extreme viscidity; it also becomes rancid and of a yellow colour after long exposure to air.

Copal varnish answers well for making paper semi-transparent; but attention must be paid to the fact that there are three kinds of copal varnish sold—one being an oil varnish, another a spirit, and a third a turpentine varnish. The first of these must be avoided; for, although by it paper is rendered translucent, the strong yellow colour which is imparted to the paper seriously impairs its usefulness. Turpentine copal varnish may be made by warming gently a pint of spirit of turpentine and stirring into it by slow degrees four ounces of powdered copal, prepared by being melted, dropped into water, and then dried and pulverised.

A varnish formed of Canadian balsam dissolved in turpentine supplies an excellent means of making paper transparent. The mode by which we succeeded best was to apply a pretty thin coating of this varnish to the paper so as to permeate it thoroughly, and then give it a good coating on both sides with a much thicker sample. Keep the paper warm by performing the operation before a hot fire, and apply a third or even a fourth coating until the texture of the paper is seen to merge into a homogeneous translucency. Paper prepared in this way has come nearer than any other to our ideal of perfection in transparent paper.

It is an old saying that often the best part of a paper read at a photographic society is the discussion which follows. The last meeting of the South London Photographic Society gives fresh confirmation of this idea. Mr. Fry's paper was neither long nor exhaustive; but good as it was in itself it elicited an interesting discussion, or rather comparison of ideas, among men qualified to speak from practical knowledge. Mr. Blanchard called attention to Mr. Jabez Hughes's double or two-decked studio, of which we have elsewhere given a description. Mr. Morgan gave his experience in shortening exposures by removing the glass over the head of the sitter just before uncapping his lens—a good hint for taking quickly babies, dogs, and such "kittle cattle," as they say in the north. Then Mr. Hooper insisted on the value of possessing the power of excluding *all* light in the glass room, and of being able to make it not only a veritable dark room, but also of introducing the light at will from any portion whatever. By this means only, he insisted, could one know how to perfectly light the sitter, as well as with how little light, when it came from the right source, a portrait could be taken. There is no doubt that photographers are usually too prodigal with their light. Mr. Fry was also able, by means of the model of his glass room, containing miniature background and screen, to make his ideas very clear, especially his arrangement for taking the so-called "Rembrandt" portraits. We recommend this novelty of Mr. Fry's, namely, introducing a model; it is a good idea. No education is so impressive as that imparted by object-teaching.

EMULSIONS OF SILVER BROMIDE AND SILVER CHLORIDE.

Before leaving home in the summer of 1872 I made a series of experiments directed towards the obtaining a clearer insight into the principles upon which depends the emulsion process, the results of which I have not hitherto published, but now propose to describe with as much brevity as is consistent with clearness.

Much of the obscurity which envelopes the behaviour of bromide emulsions depends upon the slow solution of silver nitrate in mixed alcoholic and ethereal solvents, and upon the somewhat gradual manner in which silver bromide is formed in viscid liquids. This has led to a good deal of assumption, unsupported by proof, as to the condition of the constituents of the emulsions after various intervals. It occurred to me that a convenient method of directing the investigation of these ambiguities would consist in forming silver bromide by precipitation from aqueous solutions, and then incorporating it in collodion.* I found that by well washing the precipitated silver bromide—first in water, and then in alcohol to get rid of the water—it emulsified easily and completely with plain collodion.

It is evident that by operating in this way, one can be perfectly certain of the character of the silver bromide (and chloride) employed. These substances can be precipitated in presence of excess of silver, or of excess of bromide, according as desired; and when transferred to plain collodion and emulsified with it, free silver nitrate can be added, or free soluble bromide. In a word, the mixture is completely under control, and there can be no uncertainty as to what is present in it. Especially there cannot be present at the same time free silver nitrate and free alkaline bromide.

On the other hand, a conspicuous peculiarity accompanies this mode of working. Collodion undergoes certain marked changes by keeping after dissolving in it the alkaline salts, which changes must influence

* If I am not mistaken, this method of forming an emulsion has been lately published by other experimenters, but with different objects and purposes from those in question here. At the time I employed it it had not been. All of the experiments described in this paper, without exception, were made more than two years ago.

the final result. Also, there can be little doubt that, when silver bromide is formed within the collodion, it combines with some organic constituent of the collodion, which materially modifies its behaviour. Intensity of image depends very much on these two points; it was therefore foreseen that the images obtained in this new manner of operating would probably be very thin—too much so for practical utility. Nevertheless the experiment seemed important as tending to fix the conditions of clean action, and whether the necessity existed for free bromide being present.

Another point is that it is quite possible, by dissolving suitable organic matter in the water from which the bromide is precipitated, that the difficulty of thinness may be removed; and thus this mode of preparation may hereafter become the foundation of a new practical system by which a sensitive emulsion may be prepared ready for use as soon as mixed. This is a direction in which I have as yet made no experiment, but is one that seems well worth pursuing. I pass now to the details of experiments made.

1. Silver bromide was precipitated in presence of an excess of alkaline bromide (one equivalent of haloid to seven-eighths equivalent of silver nitrate). Plate coated, washed, sensitised with litmus, gum, sugar, and acetic acid, and exposed to gaslight under a negative. (Note—These first three plates were exposed under negatives; all the rest were exposed in the camera.) *Result.*—An excessively pale and thin image.

2. Silver bromide precipitated in presence of excess of silver nitrate (one equivalent of silver nitrate to seven-eighths of haloid); sensitised as in No. 1. *Result.*—A faint image, and difficult to intensify; but better than No. 1.

3. Same as No. 2; but a small quantity of silver nitrate, about a grain to the ounce, was dissolved in the collodion. *Result.*—No image at all, but quickly became dark and foggy.

The next set was as follows:—

4. Collodion with silver bromide, precipitated with excess of silver.

5. Same, adding a grain to the ounce of silver nitrate.

6. Collodion with silver bromide, precipitated with excess of alkaline bromide—a grain to the ounce of silver nitrate.

7. Collodion treated some days in advance with *aqua regia*, then silver nitrate, two grains to the ounce, and silver bromide, precipitated in presence of an excess of silver salt.

Result.—As to holding in suspension, No. 5 subsided most rapidly of all four, and No. 7 least rapidly of all. I conclude from this that the use of *silver in bromide emulsion, as first proposed by me, has, beside its other advantages, that of keeping the silver haloids better emulsified.* No. 6 remained suspended better than Nos. 4 and 5, but not so well as No. 7.

I long since expressed the opinion that the sensitiveness of bromide emulsions depended to a considerable extent upon the colour which they show by transmitted light. When bluish, they have little sensitiveness; when brownish, much more. The same emulsion will generally by standing acquire more and more of this brownness by transmitted light. The above four collodions by standing twenty hours exhibited this brown colouration in the following order:—No. 7 brownest; then Nos. 6, 4, and 5; No. 5 being the least. It will be observed that this is the same order as in respect to remaining in suspension.

It is worthy of remark that a great change took place in these emulsions by standing. When first the precipitated bromide was shaken up with the collodion the emulsion was thin and watery. Poured over glass it gave a very transparent film—bluish when examined by transmitted light. By standing three days, with occasional shaking, a curious change took place. The collodion became almost too thick to pour—in some cases quite too thick—and needed to be considerably diluted before a smooth plate could be got. Also, the films were more opaque to light, and the bluish cast was absent.

I would call special attention to this, because it is not only new, but contrary to received ideas. Emulsions made in the ordinary way become gradually denser by standing, and it is customary to ascribe this change to the gradual and continued formation of silver bromide. It is even assumed that, as long as the collodion continues to thicken, it is a proof that there exists silver nitrate as yet unattacked by the alkaline haloids. But it is certain that silver bromide itself gradually thickens an emulsion. By remaining in contact with the collodion it undergoes some very remarkable change, so that the emulsion might be diluted with its own bulk of plain collodion and yet be thicker than when it was first formed. Whatever the change may be, its first effect is to make the collodion thick, viscid, and opaque. Sensitiveness also increases; and it is very probably this change which, ultimately advancing too far, eventually destroys the usefulness of the emulsion. At any rate, the explanations which have been up to this time hazarded seem to be so completely negatived by the results of the series of experiments detailed in this paper that this is, perhaps, the only hypothesis left.

Plates prepared with these collodions were sensitised in the same way as the first, always washing after coating and before sensitising, except in the case of No. 4, where there was no free silver nitrate in the collodion. These were exposed in the camera at a view.

Result.—Nos. 4 and 7 did fairly. No. 4 gave an image of a pure steel grey. No. 7 had a slight brownish tinge and was greatly more dense on the high lights *(effect of the presence of silver chloride).* No. 5 was entirely insensitive and veiled. No. 6 fogged densely, but nevertheless showed an image, whereas No. 5 showed none at all.

Interesting conclusions follow from these. It is clearly undesirable that silver bromide should be precipitated in presence of excess of alkaline bromide, and then be used in presence of free silver nitrate. The effect is insensitiveness, as shown by No. 5.

Neither should silver bromide be precipitated in presence of excess of silver nitrate, and then be used in presence of free nitrate; for the result, as shown by No. 6, is fog, *unless silver chloride be used in connection with the bromide.* This completely alters the result, as is shown by No. 7—fog disappears and we get a good image.

No. 4 shows that with silver bromide precipitated in presence of excess of silver nitrate, and used only after that excess has been removed, clean images are obtained, but thin, owing to the absence of free silver nitrate. If, in order to get more vigour, we add free silver nitrate, fog comes (No. 6). Only when we farther add a chloride (or *aqua regia*) do we get intensity and clearness together. This is the cardinal point upon which my chloro-bromide process is based. So advantageous, and, indeed, so essential is it for the production of films giving both sensitiveness and vigour, I think that if the very sensitive dry plates now produced commercially by the emulsion process were analysed silver chloride would be found to have entered into the composition of all of them.

It is to be observed that the system of experiment used in this examination is so sharp and decisive that there can remain no doubt on any point involved. The old uncertainties are removed. There is no excess of silver nitrate present, unless it is expressly added, and when expressly added there is no doubt possible as to its presence.

No. 4 also shows that, when no free silver nitrate is present, washing the film previously to applying the so-called "preservative" is unnecessary. M. CAREY LEA.

(To be concluded in our next.)

HELIOCHROMY.

M. DE SAINT FLORENT has caused some further notes to be issued upon his experiments in this direction. A description of his process was given in our pages some time ago; but whatever is published on so important and interesting a subject as heliochromy by or through this able chemist cannot fail to attract attention.

In order to enable our readers to follow these notes, we shall, under the guidance of the writer in the *Bulletin*, recal to mind some of the leading features of the process. And to begin with, it will be remembered that he demonstrates that it is possible to obtain heliochromic impressions without the intervention of a substance capable, under the influence of solar radiations, of disengaging chlorine or oxygen in a nascent state.

Thus, if one expose under a painting on glass a sheet of paper coated with sub-chloride of silver, adjusted so that it may be examined by transmitted light, and freed by washing from excess of hydrochloric acid, a negative image will be obtained showing all the colours of the original, and if exposure be prolonged the image will become positive. The result is quite similar if in place of the sub-chloride simple white chloride of silver be employed—a thing to be explained by the supposition that the diffused rays which pass along with the coloured suffice for producing a certain quantity of the sub-chloride in the paper. The transformation of the negative image into a positive one arises perhaps from this—that in the latter period of reduction there is formed on the surface of the paper, in the parts corresponding to the whites of the image, products of which the colours are less deep than those of the sub-chloride. Perhaps, also, this transformation is due to the oxidising action of the less refrangible rays; but this is a subject that it will be better to discuss at more length further on.

The negative image can also be changed into a positive one by printing in the following manner:—When removed from the frame the print is plunged into a mixture of nitrate of mercury and chloride of sodium, in which the latter is greatly in excess. On exposing it thereafter to the sunlight it becomes positive, and presents those feeble shadings which are sometimes complementary of the primitive colours. It is possible that the saline mixture exercises in this case a more energetic chlorising action on those parts of the image where the reduction has been most complete under the influence of the light during the production of the negative impression.

Entering into further details, M. C. Koziell, the writer of these notes, proceeds to give sundry formulæ for the preparation of the paper and other matters. And, first, the sub-chloride of silver. This is prepared by plunging any good ordinary paper—gelatinised or albumenised—into an alcoholic nitrate of silver bath, composed by adding to equal parts of distilled water and nitrate of silver—say twenty of each—100 parts of alcohol and ten of nitric acid. The addition of the nitric acid is for the purpose of hindering the reduction of the silver salts by alcohol—a reduction which, without this precaution, would proceed very rapidly. There is nothing absolute in the proportions here given, and they may be varied pretty extensively without any serious inconvenience. It is better, however, to keep as near to them as possible if proofs of great intensity are desired. On issuing from this bath the paper is dried in blotting-paper, and then immersed in—

Hydrochloric acid	50 parts.
Alcohol	50 „
Nitrate of uranium	1 part.
Chloride of zinc	2 parts.

The chloride of zinc seems to give liveliness to the colours; but it has the inconvenience—common, however, to all the other chlorides—of giving rise to ground tints when it is in too large a proportion. The nitrate of uranium added to the bath appears to have an influence on the rapidity of the formation of the sub-chloride of silver.

When taken from this hydrochloric bath—in which it should only be allowed to remain for a few minutes—it is exposed to the light until it takes a violet-blue tint in the case of ordinary plain paper, or a violet-lavender if the paper be gelatinised or albumenised. If the tint obtained be sufficiently intense there will be no need for further preparation; printing may be commenced at once. Strongly-salted and albumenised papers give excellent results, and with papers of that sort M. de Saint Florent employs in preference weaker solutions. If kept away from the light sheets of paper containing the sub-chloride of silver it may be kept for a very long time, but it is better, on the whole, to use it shortly after preparation.

When it is desired to obtain a heliochromic image the sheet of paper is immersed in this bath—

Water	100 parts.
Acidulated nitrate of mercury	A few drops.

The exact proportions of mercury are not given, for the reason that the degrees of purity and concentration in the nitrates of commerce are so very variable. It will suffice to diminish or augment the quantity of this substance as necessity requires. If the proportion of it be too small the image will be negative; if, on the contrary, it be too great the colours will want life. Some preliminary trials will easily determine the precise quantity which it is desirable to use. In any case it is desirable to filter the solution in order to eliminate the nitrate base that is precipitated to the bottom of the vessel in which the mixture is made.

Here, for the present, we must leave the subject; but further details will be published when the next *Bulletin* brings the remainder of M. Koziell's paper to hand.

REMARKS ON THE ENLARGEMENT OF NEGATIVES BY THE WET PROCESS.

[A communication to the Manchester Photographic Society.]

It is with considerable diffidence that I appear before you tonight on the subject of enlarged negatives, following so closely on the heels of Mr. Brier, whose able and well-delivered remarks interested us all so greatly at the last monthly meeting. True, I had intended at some future meeting to bring before you some results of my own attempts at enlarging, but had not the slightest idea of doing so on this particular occasion until within the last few days. It was then made known to me that Mr. Coventry would, in consequence of absence from home, be unable to fulfil his promise of a paper for tonight, and that, therefore, the gap thus created should in some sort be filled up.

The principle of making small negatives and afterwards reproducing them on a greatly-enlarged scale is one which promises so immensely to lessen alike the toil of the amateur and professional during a summer campaign, that it is not to be wondered at so much should have been said and written in its favour, and so many experimentalists should have devoted their attention to its more complete development. But the idea of going out with a small satchel camera and plates of 4 × 3 or thereabouts, and by a second operation conducted quietly at home enlarging them to the extent of four diameters, instead of the heavy 12 × 10 or 15 × 12 apparatus and its concomitant weight of glass plates, is in itself so fascinating that, supposing the results thus obtained should fall somewhat short of the intrinsic excellence of a large direct negative of the highest quality taken with a lens of long focus, there is a temptation to look upon it with some degree of favour.

I am, however, inclined to think that it is at present an open question whether, by having a small negative of sufficient merit, an enlarged one made therefrom may not in some respects be better, and optically more perfect, than a large direct negative taken with a lens of great focal length; for it is well known that, when a lens of short focus is used, all objects beyond a certain distance from the camera—that distance being determined by the focal length of the lens—are, for all practical purposes, equally sharp in focus. You will doubtless perceive this in many of the examples I have with me tonight being enlarged from negatives made with small lenses; whereas with a lens of long focus it would be absolutely impossible to get objects in so many different planes of distance of equal sharpness with these examples. Generally the only approach that can be made thereto is by the trick of swinging the plate either vertically or horizontally, and sometimes both.

Thus, the optical conditions being theoretically more favourable to the enlargement method, it remains to be seen whether skilful manipulation can bring about a successful issue. Of course there still remains the difficulty of roundness of field, which is more or less the weak point of all lenses. You will, no doubt, detect some such remissness of marginal definition in some of these examples; because when such failing exists in the small negative the evil is, of course, greatly intensified in the subsequent enlargement. I do not know whether it will ever come within the scope of optical science entirely to overcome the difficulty; but in the best-made objectives the evil has been reduced to such a degree of insignificance that, when all needful precautions are taken, it ceases to become a very serious objection, and where everything else is so good I should not be disposed to find fault.

Whilst some differences of opinion exist as to the best process for the production of high-class enlargements, the importance of working from a transparency of unblemished excellence is universally admitted; but of the many methods by which that transparency may be made only two may be fairly said to lie within the scope of the members of this Society, viz., the printing of the transparency by the superposition on a dry film of the original negative, or the printing from that negative by means of lens and camera on a wet collodion film. The former of these methods was ably dealt with by Mr. Brier at the last monthly meeting, and the excellent examples he brought forward on that occasion are quite capable of holding their own when brought into competition with anything I shall be able to show you tonight. It is, therefore, from no captious spirit of rivalry that I appear before you as an advocate of the wet process, but rather to help on the already-mooted inquiry as to the best process.

If the nature of the transparency be of paramount importance, so also the nature of the small negative is not a whit less important; for it is here where the utmost skill and most artistic judgment are demanded. It is not sufficient that it be of average excellence, but it should be of marvellous perfection, and as microscopically sharp as it is possible to get with the best lens up to the very corners of the plate. It should be photographically thin, *i.e.*, too thin for good paper printing, well-exposed and full of detail; for in an under-exposed plate, forced up by prolonged development, the film presents a coarse, granular effect under the microscope, which, however well it may answer for paper printing, will never make a respectable enlargement. I also prefer the negative unvarnished.

Several of the examples I have brought with me tonight are produced from Professor Piazzi Smyth's beautiful negatives of the Great Pyramid, taken in 1865, and kindly lent to me by him for the purpose of making myself a set of lantern pictures from them, and also with the further privilege of publishing such copies at discretion.

These negatives were taken with the greatest skill and care, chiefly for the purpose of printing transparencies for the lantern, the camera in every instance being carefully levelled with a spirit level, and tilting being always scrupulously avoided, thus securing the more perfect freedom from distortion. Their general excellence is such that, I venture to say, they will not suffer by comparison with the very best works of the best living photographers. I have brought with me some of the transparencies from which the enlargements have been made. I cannot let you see the negatives themselves, even were I at liberty to do so, for they have never been varnished, and therefore would not be safe to handle. Besides, I promised that they should suffer no deterioration in my hands, nor, in fact, be subjected to any risk, and that promise must be religiously kept. The average amount of amplification to which the pictures have been carried is about three and a-half diameters of the originals, some of them being a little over four diameters.

I may here remark that, although a negative may sometimes be amplified to the extent of six diameters with perhaps increased artistic effect, I do not think it advisable as a rule to increase to more than four diameters. The half of a stereoscopic negative will on this scale produce a good 12 × 10, and I think then our ambition ought to be satisfied.

The success of the wet collodion process for making the transparency depends largely on the use of gelatine in the iron developer, while it depends in part on the use of a collodion well ripened with age, somewhat thin, and not too rich in the bromo-iodide salts. I need say no more about the collodion, except that if, when the film is excited in the bath, it presents a dense and creamy appearance it should be diluted with plain collodion and ether.

The gelatine solution used in developing is made by an old and almost forgotton method given many years ago by Mr. M. Carey Lea. I can give you the formula, although I have never actually made it myself; and for the stock I am now using I am indebted to Mr. Sidebotham, who gave me a bottleful about two years ago, and as it had then been made some years previously it was reported to be a fine old crusted sample. Whether or not age really confers on it some improving qualities I am not in a position to say. The method of making the solution, as given by Mr. Carey Lea, is as follows:—Add an ounce of sulphuric acid to three ounces of water, and set aside to cool. Then add to this liquid an ounce of good gelatine; let it swell and dissolve, placing it for that purpose in a gently-warm place, not exceeding blood heat, for twenty-four hours. Then add iron filings in excess, avoiding all application of heat; let it stand for several days. Finally, add a little acetate of soda, filter, and dilute to fifteen ounces. I believe it will be found necessary to dilute before filtration.

The above formula was given at the time as a new developer to be used alone, and I remember trying it in 1865 in conjunction with the late Mr. Petschler; but it did not then answer in our hands used alone, the development being exceedingly slow, and the films had, on drying, a most tantalising habit of splitting into ribbons and curling up after the fashion of wood shavings, leaving the plate quite bare. The best results I have obtained in transparencies have been by a very sparing admixture of it with an ordinary iron developer of about twelve or fifteen grains to the ounce, using the gelatine solution in the proportion of about one drachm to two ounces of the iron developer, and such has been the plan adopted in making the transparencies from which these enlargements are produced.

I need hardly point out that the conditions demanded in such transparencies are that the exposure shall be more ample, and the development carried on further, than is necessary in the production of lantern pictures. I have only brought with me a few of the transparencies; these will be sufficient to show the conditions desired in every case. I deprecate the use of varnish except on the enlarged negative for printing. The best transparency will be produced from a thin unvarnished negative, and such transparency, in its turn (still unvarnished), will produce the best enlargement.

I have here a picture enlarged from a negative by Mr. Lund, and, I dare say, well known to many present, because it has been shown on the screen and recognised as a high-class lantern picture. It is from a varnished negative which has been used for paper printing, and, as a consequence, I do not think the effect is so good as the productions from the unvarnished ones, although the negative in itself is of equal excellence.

The safety of an unvarnished negative would, of course, be seriously endangered by contact printing, and besides this drawback, unless the best patent plate be used both for the negative and transparency, there are many chances against getting an absolutely sharp print; but, supposing every precaution be taken in this respect, immunity from risk is not then always secured. Minute excrescences on the varnish will sometimes attach so firmly to the film of a dry plate, when brought in contact with the negative, that a separation cannot be made without utter ruin to it.

I think I have now sufficiently stated my case in favour of the wet collodion process as a means of producing enlargements, and I shall not trespass farther on your time than is really necessary.

I now come to the manipulation of the enlarged negative, and this is simply a repetition of the method used in making the transparency, with one or two slight modifications. I use a somewhat heavier collodion, also a stronger solution—say twenty grains to the ounce of iron solution—and half the modicum of gelatine solution. I also intensify with pyrogallic acid, acetic or citric acid (or both mixed) and silver after the ordinary fashion before fixing. I prefer, however, not to carry it quite up to printing density, but after fixing with cyanide of potassium to intensify just a little farther with the pyrogallic acid and silver solution. This application, when judiciously performed, strengthens up the highest lights, and gives sufficient crispness to take away the flatness which might otherwise stigmatise the negative as a copy.

On the camera and lens arrangement I need not dwell, Mr. Brier having so clearly described it, and the arrangement itself being so exceedingly simple as to suggest itself to the most ordinary mind.

Of the various lenses spoken of my own preference is decidedly in favour of the rectilinear of Dallmeyer or the doublet of Ross, either rapid or wide-angle, for I have tried them both without satisfying myself as to which is the best; but in either case the best results will be obtained by using a lens which will cover well a larger plate than that from which the enlargement is made.

I have now endeavoured to give, with all the particularity that the limited time at my disposal has allowed me, an account of this method of enlarging. I had hoped before preparing such a paper to have done more actual work; so far as I have gone, however, the results are before you, and will, no doubt, be estimated according to their proper merits.

J. Pollitt.

AN HISTORICAL ACCOUNT OF THE USE OF PRE-LIGHTING FOR THE SENSITIVE FILM.

At a recent meeting of the Photographic Society of France, as our readers may remember, the Secretary, M. Perrot de Chameux, was requested to draw up an account of the employment of this method of supplementing exposures. As a result of that request we have the following interesting memoir, of which we present the substance to our readers:—

M. Perrot de Chameux states that the idea of an auxiliary exposure dates almost from the earliest days of photography. In the year 1840, twelve months after the publication of Daguerre's process, Becquerel stated that certain rays acted but slowly on the haloid silver salts, and that the action of these might be continued by other means after ordinary exposure had started it. He accordingly divided the rays of the solar spectrum into "exciting" and "continuing" rays.

Shortly after MM. Buron and Lerebours got some very remarkable results, and M. Gaudin, in continuing the action of light on the Daguerre plate by means of a screen of red glass, obtained, during a high wind and near the zenith, a representation of some clouds in half-a-second. Accelerating substances were not known in those days. Becquerel, continuing his researches, found, a few weeks after, that yellow light was superior to red for sensitive papers; and about the same time M. Fortier, sen., obtained instantaneous pictures in working with a dark chamber the sides of which were not of wood, but of yellow glass; and in 1843 Becquerel published, in the November number of the *Annales de Chimie et de Physique*, the following very interesting note:—

"If chloride of silver be spread on white paper, or on any surface whatever, and exposed to the rays of the solar spectrum, after a greater or less time a reaction will be visible towards the extreme violet, and will extend almost to the line F in the blue on the one side, and beyond the visible violet; but if the chloride of silver, after having been prepared in a perfectly obscured chamber, be exposed for however short a time to diffused or solar light—not in such a manner as to be darkened, but merely till the darkening action has begun—and if it be thereafter placed in the spectrum, there is visible not only a colouration in the extreme violet, but an action is manifest in that part of the spectrum containing the less refrangible rays, even to the extreme red, so that the blackened space spreads along the whole length of the luminous spectrum and beyond the violet."

This observation confirms the idea enunciated by M. Franck de Villecholles relative to the utility of preliminary lighting for the reproduction of paintings, and it might also prove of great use to landscape photographers. Becquerel states, further, that all the salts of silver exhibit the same phenomenon, although the range of action may not be absolutely identical in each.

The discovery of "accelerating substances" had the effect of turning the attention of explorers aside from the practical application of these facts. However, in Blanquart-Evrard's treatise on *Photography on Paper*, published in 1851, we find a chapter on the employment of a camera with a white interior. The author maintained that by this means we could augment the sensitiveness of plates in the proportion of nine to fifteen, or almost as much again. In spite of his powerful sanction the plan was never practically adopted. But in support of Blanquart-Evrard's opinion, however, an article of M. de Constant's, published in the *Bulletin* of 1870, may be cited, in which that gentleman recommends a camera partially whitened in the interior according to the effect which it is desired to obtain, and the articles of Mr. Blair on the same subject may also be recalled—articles which M. Perrot regrets having been unable to procure in time to analyse.

In the same year's *Bulletin*, page 143, M. Bazin states that he had obtained an acceleration of a third in his exposures by using a red illumination in his camera, and which he managed to get by inserting red glass—glass coloured with carmine dissolved in ammonia—in the sliding panel which held the lens.

The same gentlemen and M. Wacquez returned to the subject in 1872, and discussed in the January *Bulletin* for that year the best means of introducing red light into the camera; and at that time also M. Davanne recalled the fact that M. Leon Foucault had been wont, when great rapidity was sought, to expose his sensitised plates for a longer or shorter time to the light of a Carcel lamp. The same, or an analogous idea, had, according to M. Davanne, occurred to M. Levitzky, of St. Petersburg. His plan was to expose the plate first of all to a piece of velvet held some distance before the lens, and then to take the picture.

Finally: M. Perrot says the subject was taken up in the American journals; but from the sources he mentions we should be inclined to think he must be mistaken, and that it was really the English journals which stirred in the matter and led to its being echoed there. The use of green lighting was, however, certainly advocated in the Brooklyn Photographic Society by Mr. Newton. Necessarily a review of this kind is very imperfect; and from the great numbers who have recently devoted some attention to the subject it was not to be supposed that M. Perrot could include above one or two of those who had helped to revive the idea. The chief interest of his paper lies in the fact that he has shown once more how early in the day many of the apparently most modern ideas connected with the development of our art had been mooted, and how difficult it is to say that anything is absolutely new.

MR. SAMUEL FRY'S STUDIO.

[A communication to the South London Photographic Society.]

I have with much pleasure consented to the wish of your worthy Secretary that I should read a paper before you.

For some years the South London Photographic Society has in a very praiseworthy manner made the furtherance of the art qualities of photography its leading feature, and none can do otherwise than admit that this has been of very great advantage to the commonwealth of photography.

Early in last year I built the studio of which a model is now before you. For the previous ten years I had satisfactorily worked in one; but at that period, owing to the unexpected erection of a large building immediately adjoining, my light was so completely taken away that I had no option but to build another. Fortunately the extent of the land on which the house stands enabled me to do this.

The change in public opinion of photography showing an immediate appreciation of art qualities and subtle effects of lighting determined me to erect a building capable of giving a great variety of light with promptitude in the changes. You will remark that the side light is low—six feet only—and prominence is given to a large roof light, combining the united influences of side and top light, of which the proportions may be indefinitely varied according to the form of the sitter's visage. Either end is available, and a very slight change in the blinds only is necessary to secure the full results.

The aspect is north, slightly inclining to east. During the summer months the early sun, up to about half-past nine, shines in, and it is then clear for the rest of the day. The height of the roof was designed from careful calculation, so as to just exclude the midday sun on the longest day, and the result has been exactly achieved. Had the roof been any lower it would have required an external blind running along the ridge to do it.

On the side lights I use no blind, employing instead large, light folding-screens, covered with dark material, and having the outer leaf or fold of the screen covered with transparent muslin; by manipulating this screen between the sitter and the light a great variety of effects are very readily obtained. Nothing of this kind is obtainable with blinds, unless in very peculiar aspects.

I now ask your attention to the square window in the north wall. This is of ground glass, was especially made to produce Rembrandt effects, and is very successful. This is a model of the large screen at the end of the room which covers up the window when not in use. One side of this screen is covered with a lightish-brown cloth, in one piece, and the other side with a French grey. This latter is used for vignettes. By the way, I may here remark how very often we find vignettes taken on a dark background. Nothing can be worse, leading to dark patches over the head and shoulders, and the delicate outline of the hair is lost or becomes indistinct. The beautiful vignettes of the late Mr. T. R. Williams and those of M. Reutlinger were taken on lightish-grey screens.

When we wish to take a Rembrandt picture the screen is turned at an acute angle to this window, with the lighter side inwards, thus tending to mellow, by a gentle reflection, the tendency to extremes of lighting. By this system the camera is placed in or near the middle of the room, and the screen is so made as to cut off the light from the window from the lens. A large variety of effects are here produced, and a reflection of grey paper is often wanted to prevent masses of extreme shadow on the off side. Pictures produced at this window are the favourites with the public; the choice of the usual set of four *poses* being generally for the largest number from this negative. Necessarily a prolonged exposure is required, which is still further increased if dark dresses are worn. This, however, you cannot help.

For another class of pictures, of which an example is before you—having a considerable proportion of the face in soft shadow, but with less vivid or decided effect than is produced at this window—I place the sitter near the middle of the room, and with one of the large screens drawn pretty closely up I manipulate until this effect is seen. The camera is at a rather acute angle to the light, and will, therefore, need to be carefully shielded to prevent fog. This system does not require an appreciably longer exposure than with ordinary lightings. For ventilating there are two louvers, each two feet square, movable by a cord from within. They, without admitting light, speedily cool the upper part of the studio in summer, and, as the side lights lift completely away, the interior is kept very cool, entirely free from the close and noxious feeling of closeness so common in studios. For warming in winter pipes pass round the studio, near the floor, and through the other rooms used for business; also through a cupboard, which forms a hot room for warming baths and solutions, drying plates, &c. Thus the extremes of temperature, so trying to photographic operations, are, as much as may be, neutralised, and this seems to complete the set arrangements devised for this studio. Equally complete, with as many novelties, and as successful in working, are the arrangements for enlargements and also for printing.

Samuel Fry.

A FEW WORDS ABOUT CONTINENTAL PHOTOGRAPHIC TOURS, AND HOW TO MAKE ONE PAY ITS EXPENSES.

The principal operator of a leading photographic portrait establishment in London has written to ask me whether I think a continental photographic tour would pay its expenses, either wholly or in part, or would bring any profit to the tourist. The question being one of considerable interest to many people I have thought it well to publish my reply, after giving the matter much serious consideration.

Assuming that the common wet collodion process is to be employed, with a tent, the question of whether a continental tour would pay its expenses resolves itself into the two following queries, viz.:—

1. Would it pay if the ordinary class of subjects were taken in the ordinary way?
2. Would it pay if some novelty were introduced?

With respect to the first query, many important points will suggest themselves for consideration before a rational conclusion can be arrived at. In the first place, I much fear that an operator who has only been accustomed to take portraits in a studio would find himself surrounded by many unexpected difficulties when he began to work in the field. He would have to modify not only his optical appliances, but also his process, before he could obtain first-class results. Portraiture and landscape are distinct branches of our art, and the portraitist who has suddenly turned view-taker will find—unless he modifies his process to suit the altered conditions of the case—his negatives thin and veiled, blurred and solarised, or else hard and devoid of detail. To put this very clearly before him: let him imagine that, instead of a flat, grey background behind his sitter, there is an open window through which is seen a landscape beyond glittering in the brilliant light of a continental sun. How would he meet the difficulty, so as to include in his negative not only the dark details of the black velvet dress of the sitter, but also the delicate gradations of the extreme distances of the view? And yet this is not a more difficult problem than the landscape photographer has presented to him every day, for the dark details of the black velvet dress are no darker or more difficult to bring out than the details of green foliage or dark masonry in shadow. In a word, the contrasts are much stronger in views than in portraits, at the same time that the size of the stop to the lens has to be reduced from twenty to a hundredfold for optical reasons.

Then, again, the optical appliances for landscape photography offer quite a new field of study to the portraitist. He will have continually to vary his lenses and his stops, the height of his horizontal line, and to see that he includes with good marginal definition, and without distortion or cutting off the corners of the plate, the required subject, whatever its included angle, horizontal or vertical, may chance to be. This he will find quite a new study, in which practice and theory must go hand in hand. Let him not, then, be too confident of success before he has mastered all these new difficulties in the art.

The next question for him to consider will be that of an assistant in his work; for he cannot possibly employ the common wet process in the field without one. If he travel with an assistant, that will double his expenses; whereas, if he hire one as he wants him, he will often have to put up with careless, stupid fellows who will give him an infinity of trouble, besides occasioning accidents in his work.

And, lastly, instead of all the comforts and conveniences of the dark room close at hand, the unfortunate tourist will have to work in a tent, in the midst of heat, dust, and wind, surrounded by rabble, and with a hundred annoying obstructions cast in the way of a good result. Let him, then, reflect seriously before he embarks on an undertaking which he will find very laborious, very costly, very trying to the temper, and open to innumerable accidents and unforeseen causes of failure.

And now let me sketch a little picture of what is not unlikely to occur in the very first continental town in which our tourist stops to pitch his tent. He has arrived by rail, with all his *impedimenta*, and has had it conveyed to one of the hotels of the place. It is a town, suppose, about the size of Redon, picturesquely situated at the foot of a mountain range—the Jura, the Vosges, the Puy de Dome, or the Pyrenees—and with some artistic old bits and antiquities suitable for the camera. It is glorious summer weather; so, after dinner at the *table d'hote*, he takes a stroll and reconnoitres the scene of his operations on the morrow. The view from the promenade is enchanting; so are the crooked old streets, every turn of which would make a study for Prout; so are some old churches, the old *halle*, and the river quay. He is delighted, for he has already seen at least a dozen subjects worthy of his camera. On returning to his hotel in the dusk of the evening he passes along the *grande rue*, and there sees two or three booksellers' shops, where photographic views of the place are exhibited—*cartes* at fifty centimes each, and mounted views, cabinet size, at a franc. These are not to be despised; they are decidedly good. Who took them? He enters the shop and inquires. He is told that there are two professional photographers in the town, who take views when they have time, and send them to the booksellers on sale or return. He learns, also, that at a grand *chateau* in the neighbourhood there resides a very clever amateur photographer who also takes views and sells them for the benefit of the poor. Amongst this gentleman's work (which he is shown) are some marvellous successes—panoramic views with the natural clouds, instantaneous subjects, dark interiors, &c. He is evidently an accomplished hand. And, lastly, our friend is shown a collection of views amongst the neighbouring mountains, taken in the highest style of the art, and bearing the name of Braun, of Dornach. All this is somewhat depressing, and food for anxious thought.

But the next day our friend gets to work, and takes a dozen negatives. The tent has been hauled about from place to place, and he has had his full share of fatigue and vexation. His negatives are tolerably good, but still not so good as they might be. He has another look at the same subjects offered for sale in the shops, and then comes to the melancholy conclusion that they are better than his, *and that a resident photographer has chances which a tourist cannot command.* The resident can avail himself of those happy accidents which often make a picture—an old barge in the foreground, or a cart, or a group of picturesque objects, or some charming effect of light and shadow which is only possible at a particular time of year.

Fagged, and not over-satisfied with his day's work, our friend goes to bed wiser than he got up in the morning, and with the horrid idea floating in his mind that it might be more rational, *from a commercial point of view*, to buy prints of the place ready taken, and sell them at a profit on his return home, than to take negatives himself.

Waking with a headache the next day, he resolves to make it a holiday, and pay a call on the resident photographers, have a chat with them, see their negatives, and inquire about their processes, &c. The professionals he finds somewhat secretive; but one of them is a well-educated and intelligent man. He is a native of the town, but was brought up at a *lycée*, where he learnt chemistry and optics. He takes in and reads the journals of the art, and is a member of a photographic society. His view negatives are unlike in colour and appearance any which our friend has ever seen before in his own narrow practice. They are thinner, and of a yellowish-brown colour, but they print magnificently. Are they upon dry plates? No; they are by a modified wet process. The film will keep moist all day, and the plates are prepared in the morning in the studio, and are developed in the evening. When the light and the composition are suitable the operator sallies forth and takes his view, no tent being required. Amongst these negatives are some difficult interiors of the churches, the Tribunal, the Musée, &c.—subjects which our friend well knows would be altogether beyond his power with the tent and the common wet process. But his visit to the amateur at the *chateau* is still more instructive. He is received with politeness, and is shown and told everything without the least reserve. What he is shown and what he learns it is not for me just now to say; but intelligence, education, originality of contrivance, and a thorough love of the art, accompanied by means and leisure to follow it up on the part of his host, have produced novelties of a most interesting character—some suggestive, others fully worked out. And these are the men with whom our friend the London portraitist has presumed to compete on their own ground—a little town of ten thousand inhabitants!

Now the picture which I have sketched is not at all an improbable one; for we are not now exactly in the infancy of the art, and there are hundreds of its votaries—men of education and intelligence—who read, and apply, and invent, without making any noise about it, or contributing a syllable to photographic literature. You may find gentlemen of this sort everywhere or anywhere, and many of them have carried their hobby to an extraordinary length.

And thus, by the time that our tourist has travelled over a couple of thousand miles of continental scenery, and visited some half-dozen capitals which are the haunts of travellers, and, consequently, hives of photographic industry, he will probably have come to the conclusion that the harvest has already been reaped, and the best subjects taken scores of times by resident photographers—better than he could do them, because they have had chances which he had not. What, then, is he to do with his negatives, assuming that he gets them home to England safely? They have cost him an immensity of fag, and some hundreds of pounds to take; but I doubt whether any English firm would give him ten shillings apiece for them, to print on their own account and sell in their own country, because they would know by experience that the demand for such subjects is local and confined to the place where they are taken, and where they are bought by travellers as *souvenirs*.

I think I have now shown that to start on a continental tour with the common wet process and a tent, in the hope that the negatives might pay for the expense of taking them, would be a very rash proceeding indeed. To work upon dry plates would be rasher still; whilst moist plates, which are the right thing, cannot easily be prepared *en route*, and must be reserved for resident photographers.

It must be remembered also that continental travelling is not now what it was twenty years ago. Now you pass from town to town by rail, just catching a hurried glimpse, as you rush along, of scenery which would afford the most charming subjects for the camera; but twenty years ago you could travel by *voiture*, going only a few miles per day with the same horses, and stopping when you liked to expose a plate. But all that has changed now, and continental travelling has lost much of its charm for the landscape photographer. I speak feelingly on this point, for I shall never cease to remember with pleasure the time when I travelled all through Switzerland and Italy by *voiture*. But now it is scarcely safe or possible to attempt this; for the comfortable little inns at which one used to sleep or dine are deserted and have gone to decay, whilst their civil landlords have taken to other occupations, or have joined bands of ruffians whose presence in a neighbourhood makes it dangerous for travellers to pass their way. Continental travelling now-a-days has become very anti-photographic and inartistic; besides which much that a few years ago would have delighted the eye of the artist has been modernised or swept away.

We come now to the second query, viz., whether a landscape photographer might not, by employing some new mode of operating, make a continental tour pay its expenses, or even more. The only chance for him that I can think of at present would be to work out a really good paper negative process, and take negatives of large size—say 22×18—to be printed by lichtdruck, and sold at a very moderate price for mural ornaments or educational purposes. These negatives would not require to be taken reversed; but it would not do to take them by any process of enlargement, because they would scarcely be sharp enough or sufficiently elaborate in their details. They must be taken in a large camera, direct, in order to be good enough for the purpose contemplated. It seems to me that there is just a chance that this *might* pay, because at present there would be no competition, and the results would have their use, and would to some extent supersede the kind of engravings with which the apartments both of rich and poor are commonly hung. But none of the old paper processes would be good enough for the purpose, and a new method would have to be worked out. If we could combine in a print the permanence of printers' ink, with large size, good quality, and a low price, the proofs would sell beyond a doubt.

It must be remembered also that the paper process would be perfectly well adapted for large panoramic views, bent round a cylindrical glass, and taken with the spherical lens.

The printing of magic lantern slides from large paper negatives, by means of a copying camera, would be a very simple matter, and the sale of these might swell the profits of the undertaking somewhat.

I venture to think that a hundred large paper negatives taken on a continental tour would not cost so much as a hundred small ones taken by the wet collodion process upon glass, whilst there would be infinitely less risk in the transport. The camera would not be so large as the tent, and the other paraphernalia would be less bulky and lighter. The papers could be excited and developed *en route* at hotels if a good and simple process were devised. Sensitive sheets of gelatine would, I imagine, be too costly, too risky, and imperfect for the purpose, whilst paper would give definition quite good enough for large pictures.

It is always well in taking views to take two negatives of the same subject from stations at a suitable distance apart, so as to suit the stereoscope, large or small—because, first, you will have the choice of the better of two negatives to print large numbers from; and, secondly, because it is just possible that a demand for large stereoscopic views may one day spring up. If a subject be not worth taking in duplicate it is not worth taking at all. Avoid poor subjects, and do your very best with good ones. THOMAS SUTTON, B.A.

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual meeting of this Society was held in the House of the Society of Arts on Thursday, the 12th inst.,—the Rev. F. F. Statham, M.A., President, in the chair.

Mr. Samuel Fry read a paper entitled *Mr. Samuel Fry's Studio* [see page 137], and exhibited a wooden model of the same.

The CHAIRMAN thanked Mr. Fry for his paper, which would be useful to those about to erect studios. Mr. Fry, however, was differently situated from many of his brethren who resided in London, where they had not, like those in the country, much space at their disposal.

Mr. BLANCHARD thought that Mr. Fry had got on the right track. In arranging his side light and the angle of the roof in the way he had done he gained a great deal. There were two studios which, in his estimation, were very excellent; he referred to a former one of Mr. Robinson and to that of Mr. Hughes. In that of Mr. Hughes one studio was erected upon the top of another in such a way that the lower one was entirely protected from the sun.

[We have thought the construction of Mr. Hughes's studio so excellent that we have given a somewhat detailed account of it, which will be found among our leading articles in the present number.]

In connection with the subject of exposures,

Mr. FRY said that he usually gave ten seconds with the open aperture of a 2B Dallmeyer lens.

Mr. TULLY thought that this was an unusually long exposure, but——

Mr. FRY explained that he sometimes took good negatives with an exposure of only two or three seconds.

Mr. HUGHES described his experience in glazing his studio with Hartley's green glass, particulars of which will be found in the article on his (Mr. Hughes's) studio referred to above. He further spoke of the great advantages arising from having the roof well sloped.

Mr. TULLY considered that the country photographers possessed immense advantages over London ones in respect of the situations of their studios. With the latter it was "Hobson's choice." They had either to erect their studios on any particular house-top or corner where they could or not at all. He considered white calico blinds as a means of softening light a mistake. In a short time they generally showed yellow markings and streaks, suggestive of a large map of some unknown country. He used screens of tissue paper pasted upon light frames; when any of them got damaged or discoloured the paper was torn off and fresh sheets put in their place. These screens were made to slide. He also used a black blind, which, by adjustment, formed a shadow on the face to any desired effect. His was a north-east light.

Mr. HARMAN (of Bromley) had used a studio like Mr. Fry's, but he had built another open on both sides, which he found better, especially for Rembrandts.

Mr. HOOPER used a studio erected by Mr. Robinson, similar to that of Mr. Fry's, but the roof not being so acute he was troubled with the sun four months in the year. He used wooden blinds, and could close out all the light if it were so desired. He described the kind of light by which he took a portrait of a dead child, and recommended the use of less light than many photographers employed. He did not at all agree with the ground glass window in the end of Mr. Fry's studio. When he was in Edinburgh recently he had examined the studio of Messrs. Ross and Pringle, by whom he had been most courteously received, and found that they had a very high side light and very little top light. They used upright reflectors.

The CHAIRMAN spoke of the great importance of the subject of the changing of the colour of glass to light. It was a subject worthy of the deepest consideration.

Mr. HUGHES said that the subject had, some time ago, been pretty fully discussed in the photographic journals, and was, therefore, not unknown to photographers.

After some conversation upon the colouring of glass by light and the probable causes,

Mr. HOOPER observed that common sheet glass answered every purpose for glazing studios.

As much of the conversation had special reference to the model which was on the table, it is impossible without diagrams to give an intelligible report of all that was said.

The meeting was afterwards adjourned.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A MEETING of the Council of this Association took place on Thursday, the 9th inst., at 12, York-place, Portman-square,—T. Sopwith, Esq., M.A., F.R.S., &c., in the chair.

The minutes of the last meeting having been read and confirmed, the following members and subscribers were elected:— The Hon. Noel Waldegrave, K. D. P. Roberts, Esq., A. Strohl, Esq., G. M. B. Arnold, Esq., R. O. Milne, Esq., Captain Jno. Houghton, J. E. Thornburn, Esq., J. C. Stenning, Esq., J. T. Hackett, Esq., P. Gunyon, Esq., and E. R. Lloyd, Esq.

The Secretary laid before the Council a letter he had received from Capt. Allen, expressing a wish that the complete catalogue—for which a sheet containing the names of the best pictures only had been substituted last year—might again be printed for the use of the members.

After some discussion it was decided that, since many other members had expressed the same wish to the Secretary, the complete catalogue should again be published, as in previous years.

A. J. MELHUISH, *Hon. Sec.*

Correspondence.

THE FADING OF PRINTS.—CONDITIONS FOR SECURING PERMANENCY.—TESTING FOR HYPOSULPHITE OF SODA.—WILLIS'S NEW PRINTING PROCESS.

DURING the past year a number of articles have appeared on the subject of the fading of photographic prints, and the most various reasons have been assigned for it. Amongst those which I recollect are too rapid printing, too long washing, and toning in ordinary light. I cannot think that either of these explanations is correct. I have never known a single gold-toned print of my own making to fade or show signs of turning yellow, and I have never paid any attention to the precautions above referred to. I have generally let my prints be in the water overnight, have mostly printed them as rapidly as a powerful American sun would print, and I never remember to have toned a print except by daylight, unless possibly when night may have come on before I was through. Of course I have not toned in a strongly-lighted room, but have taken the same precautions, neither more nor less, as in sensitising the paper.

I think we cannot shift the question from its old landmarks, except, perhaps, in one respect—that hardly enough attention is paid to getting a sufficient deposit of gold. With some papers, and with some modes of printing, the print comes from the frame with a pleasant colour, and a short immersion in a weak toning bath is sufficient so far as appearance is concerned. Such prints may look very well at first, but the chances are against them. A good supply of gold salt in the toning bath I look upon as essential; and when I see the boast made that a very large number of prints have been toned with a surprisingly-small quantity of gold I know beforehand what is to be their fate.

The cardinal points for permanent prints seem to be as follows:—First, a good negative. I do not think that prints coaxed out of very thin negatives by shade printing under tissue paper have the same chance of permanence as those that have been taken from negatives which admit of deeper printing. Certainly the former do not stand a strong hyposulphite bath as well. This, however, is only an opinion in which I may be mistaken. On the other hand, it is certain that if the nitrate of silver be not well washed out of the prints before toning their permanence is endangered. If a print be thrown into a toning bath without any washing at all it turns yellow at once. The importance of fresh hyposulphite and good washing is now too generally understood to need to be remarked on.

Perhaps the most dangerous of all the causes of fading lies in the mounts. Competition has reduced prices to rates at which makers look very closely to cost; and I am inclined to believe that as many prints are lost in this way as in all other ways put together. Anyone can easily try his mounts by the proper tests. For the benefit of those who may not be familiar with it I will here give the best method:—First cut up three or four square inches of the cardboard into very small pieces. Put them into a beaker, add a few pieces of granulated zinc, fill half-full with water, and, lastly, add about half-a-drachm of sulphuric acid. Quickly cover the beaker with a round piece of filtering-paper, bending it under the edges of the beaker, and let fall a drop or two of a solution of sugar of lead upon the filtering-paper. Set aside for half-an-hour, and if there has been any hyposulphite in the paper the drops of sugar-of-lead solution will have left a brown stain. It is essential that no time should be lost, after adding the sulphuric acid, in putting on the cover of filtering-paper and applying the solution of sugar. If there be much hyposulphite in the cardboard the wet mark of the lead salt will turn brown immediately. This test is so very reliable that every photographer ought to be able to apply it. To get into the way of using it correctly and reliably it is a good plan to begin as follows:—Make the experiment as above described, but *without* the cardboard, and notice that the lead drops remain white. Now lift the paper cover, drop in a very small fragment of hyposulphite, and notice the effect. Next try the cardboard. If the lead marks have not turned brown in half-an-hour the paper may be judged to be pure; but for one who is not familiar with chemical testing it is better to verify it further by adding a few drops of sulphuric acid to start the disengagement of gas again, and then to add a small crystal of hyposulphite and watch the effect.

I notice a very ingenious process, by Mr. Willis, jun., for printing with ferric oxalate, and then forming the picture in one of the noble metals.

It will need much care and experimenting to get permanent pictures by this process. When the iron salt is developed by silver the print will need fixing with hyposulphite, and it suffers very much in the fixing bath. Some years ago I made hundreds of prints in this way, trying to get a satisfactory result, but I did not get one that was altogether so. As respects pictures formed of platinum, although it is so permanent a metal it does not seem to be certain that they will share its permanence. Hunt says—"Nearly all the platinotypes, however, slowly fade in the dark."—(*Researches in Light*, second edition, page 153.) He also mentions that some of his platinum prints became converted by time from positives into negatives. In another case the pictures disappeared, but were found to have printed themselves off on silver prints lying next them (p. 158). It is certainly very curious that a print in such a stable substance as platinum should behave so singularly. Mr. Hunt also experimented on the action of ferrous oxalate in connection with platinum solution, but did not obtain any satisfactory results. I do not by any means intend to say that Mr. Willis may not get permanent prints by his process, but that it does not follow, in view of Mr. Hunt's results, that a print is permanent because formed of platinum. M. CAREY LEA.

Philadelphia, March 2, 1874.

HOW THE PHOTOGRAPHIC SOCIETY OF FRANCE MANAGES ITS AFFAIRS. —M. CAMILLE SILVY: HIS STUDIO, NEGATIVES, AND PANORAMIC CAMERA.—A WONDERFUL SECRET FOR SALE IN FRANCE.

SOME of my readers will probably be interested just now in hearing how the Photographic Society of France manages its affairs; how it has contrived to get on for about twenty years without any unpleasantness or scandal; how it has published its own journal, held its annual exhibition, appointed committees of investigation, and kept itself out of debt and all disgraceful difficulties, and is now in a flourishing condition, with a balance at its bankers', and ready to hold another exhibition in May; and this notwithstanding that terrible ordeal of the war and the siege of Paris which, only for a time, crippled its operations.

I will endeavour to point out by a reference to some of the judicious laws of this Society the main causes of its long career of success, leaving it to the reader to draw his own inference as to the true origin of the unpleasantness which has recently occurred in the management of the London Photographic Society, in which the laws affecting the Council were based on a different principle.

The Photographic Society of France was established on November 15, 1854, and it has already published nineteen volumes of the *Bulletin* of its proceedings. It is composed of three classes of members, viz., titular members, corresponding members, and amateur associates. The number comprised in the first class is limited to one hundred; in the second class to two hundred; whilst in the third class the number is unlimited. The Society has also a President and a Council—the latter composed of fifteen members, who are elected from amongst the titular members only, and by them at a general meeting. It is only, therefore, the titular members who in reality manage the affairs of the Society. The office of President is only tenable for one year, but he may be re-elected. The members of the Council are elected for three years, and five of them retire each year, *according to seniority*, but they may be re-elected. The election of five new members of the Council, in the place of the seniors who retire, having been three years in office, is by ballot, among the titular members only, and is decided by a majority of votes. The Council appoint a President of the Council, and also a Secretary and Assistant-Secretary; but the President of the Society has always the right to preside at the Council meetings if he choose. These take place every fortnight, or oftener if necessary. The general meeting of titular members takes place on a fixed day every month.

The Society, according to its rules, is bound to publish its proceedings, either in a journal of its own or by a special arrangement in some other journal already in existence, and each member is entitled to a copy, *franco*. Members of all classes meet together once a week at a *soirée* held in the Society's rooms, for the purpose of conversation. This is in addition to the usual monthly meetings.

In the event of a modification being desired in any of the rules of the Society, either by the Council or by the members, a requisition must be signed by ten titular members, and the proposition must then be discussed at a meeting to be held for the purpose two months prior to the general annual meeting of all classes of the members.

No member of the Society who gets six months in arrear with his annual subscription is entitled any longer to the rights of membership, and his name is erased from the list of members; at the same time, his subscription for the current year will be legally due to the Society, for no member can retire unless he give three months' notice of his intention to do so. The annual subscription is due on the first of January of each year.

Such are some of the principal laws of the Photographic Society of France; but the most noteworthy of them is that which relates to the annual retirement of the five senior members of the Council. Under this wise regulation no party in the Council can obstinately retain office for a long series of years in defiance of the minority or of the members outside; nor can any member of the Council who may be commercially connected with photography make use of his position in the Society, for a long series of years, to advance his own private interests and those of his friends.

I have had some interesting correspondence lately with a French professional photographer, who was a great star in London for a season or two, a few years ago, and had a studio at Bayswater. I allude to M. Camille Silvy. He is now writing a book of his photographic adventures during the ten years that he practised our art professionally in Algeria, Paris, and England, and he promises to make some very curious revelations in it which will amuse the brotherhood mightily. It will be published both in French and English, and is now "on the stocks." He tells me, amongst other things, that during his stay of a year or two at Bayswater, he took eighteen thousand negatives, and made £14,000 by them. Twelve thousand of these he has still on hand, and would be willing to dispose of them. They include, of course, a large number of portraits of celebrities and of the *élite* of the upper ten thousand.

I have seen one of his negatives, under the following circumstances:—When I was in England last autumn I spent a day with a wealthy and accomplished maiden lady, who has just built herself a beautiful mansion a few miles out of Chester, on the Birkenhead-road. I will not mention her name, but she is well known in that neighbourhood, chiefly as an amateur singer and instrumental performer of great talent at concerts given for charitable purposes. On looking over her albums I lighted upon a remarkably-beautiful *carte* of herself, reminding me more of a copy of a painting by Sir Joshua Reynolds than of a photograph from nature. It was by Silvy, and at her request he had sold her the negative for ten shillings. I must say it was a marvel of perfection, without speck or blemish, and entirely untouched; in fact, the slightest retouching would have disfigured it. It was upon rather thick plate glass, and contained eight portraits, all precisely alike. In tone, brilliancy, modelling, and perfection of manipulation I have never seen anything to equal it, whilst to these fine technical qualities were added perfection of lighting, pose, and expression. It was a perfect picture—one of those true works of art, quiet and unpretending, which steal upon you by degrees and refine your own taste whilst you examine them. If the other 12,000 of M. Silvy's negatives be equal to this one the purchasers will indeed possess a charming collection of photographic portraits, taken before the age of retouching and sophistication.

My acquaintance with M. Silvy originated in his having built a new studio according to principles which I had previously published in my *Photographic Notes*, and in his inviting me to call upon him and see it, which, you may be sure, I lost no time in doing. He had believed in the force of my reasoning, and his studio was one in which the beautiful Duchess of Devonshire might have sat to the fashionable painter of her period, so thoroughly was the lighting of the sitter managed on the principles which painters approve but photographers generally ignore. There was no glass roof, you may be sure; no top lights; nothing but a side window and a white reflector; and the eyes of the sitter were directed into darkness. In this room—alas! how rare to this day are such photographic studios! and how obstinately photographers still persist in building glass houses!—were taken most of the portraits which so quickly brought a handsome fortune to the French artist domiciled at Bayswater.

But it was not merely to show me his new studio, built according to my own published ideas, that M. Silvy invited me to visit him. He had taken up with enthusiasm my panoramic camera with curved glasses, and wished to consult with me about various points in connection with it. He has since patented a modification of my camera, in which paper is substituted for glass, and is wound off from one cylinder on to another. This instrument is now at Messrs. Ross and Co.'s, and I hope that in a few days it will be in my own possession, so that I may be able to give a graphic description of it. The object is to use it for purposes of military engineering, and M. Silvy is now in treaty with a leading military authority in the French army with a view to its introduction. Three or four years ago he made a journey of two hundred miles expressly to visit me at Redon and show me a waxed-paper negative a yard long, including the whole horizon, which he had taken in this instrument, and it was certainly very successful optically; but we want a better process than waxed paper now-a-days, and that has yet to be worked out.

The following ancedote, for the truth of which I hold myself personally responsible, may interest some of my readers, although these are not exactly the "dog days," and I leave it to the discretion of our Editors to insert it, in the cause of humanity, if they think right:—A few days ago five persons were bitten by a mad dog in the neighbourhood of Redon before the animal could be killed. One of them was a *frère* of the Institution here, and a friend of another *frère* who comes to me twice a-week to read English and mathematics, and from whom I had this story. These five unfortunates immediately proceeded together by train to St. Malo, and thence to a village on the coast near, called St. Coulomb. There they went to the abode of an ancient and noble family named De Grené, in whose hands has been deposited for more than a century a secret medicine for curing or preventing hydrophobia. It was at six in the morning when they presented themselves before M. De Grené and craved his valuable aid, which was immediately accorded to them free of charge. To each was at once administered a dose of the valuable specific, and they were then requested to walk about upon the beach for three hours, and try not to bring it up again. In this they were all happily successful, and at nine o'clock they returned to the *chateau*, and there not only received the congratulation of their host on their now perfect safety, but sat down with him to a hearty and joyful breakfast.

The family can prove, so it is said, that, although hundreds of persons have been thus dosed after been bitten by a mad dog, not a single case has occurred of any unpleasant after-symptoms. In every case the cure has been complete. The secret has been offered to the French Academy of Medicine for a certain sum—I dont know how much—which they are willing to pay after proper experiment and investigation, and on approval, but not unconditionally and in advance; to this, however, the family object.

Here, then, is a case for the charitable. Who will sift the evidence, and then buy the secret and give it to the world? We have had dupes enough lately, from merely mercenary motives, in connection with the great trial just concluded—will no one now incur the risk of being a dupe in the hope of becoming a Howard? What a chance for our London Photographic Society to do at last some good in the world by dissolving itself, and with its balance in hand buying and publishing this wonderful secret! THOMAS SUTTON, B.A.

Redon, March 13, 1874.

THE ROYAL PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I am sure that all lovers of the photographic art, both amateur and professional (I have been one of the former for some twenty-five years), "will learn with satisfaction that the division among the members of the London Photographic Society has terminated," and will join in the hope that the words of Terence may prove to be true—

"Amantium iræ amoris integratio,"

and thus much good may be the result of apparent evil.

As you suggest, at the end of your excellent leader on this subject, that "the present is the time for enlarging the base and scope of the Society," I am sure you will pardon me for suggesting that this is the time for "a long pull, a strong pull, and a pull all together"—in fact, for making this Society THE ROYAL PHOTOGRAPHIC SOCIETY. If not, why not? Surely at the present time photography has obtained a place among the arts and sciences sufficiently high to entitle it to this distinction.—I am, yours, &c., C. S. HARRIS.

St. John Little Ouse Vicarage, Downham,
Norfolk, March 14, 1874.

PHOTOGRAPHS IN RELIEF.—SUPPLEMENTARY EXPOSURES.

To the EDITORS.

GENTLEMEN,—I have not yet seen the *bas-relief* portraits lately spoken of in the Journal, but it has occurred to me that portraits in relief might be produced by some such process as the following:—Take a very thick film of bichromatised gelatine, expose it under a photograph, soak it in water until the parts unacted on by the light swell up, blot off all superfluous moisture, and then take a cast in wax, plaster, or any suitable material; a photograph on very thin paper might then be pasted carefully down on the cast. The above is merely a suggestion; but some years ago I remember to have seen some very effective plaster casts produced by photographic means by a Dr. Lowë.

There has been a good deal of discussion lately on the supposed acceleration of exposure by a preliminary exposure of the sensitive plate to light. According to my idea of the matter the preliminary exposure to light produces a certain amount of fog or half-tone, and places the plate in the same position as a piece of tinted drawing or lithographic paper. Any person with the smallest amount of artistic experience knows that it is much easier to make a drawing on toned paper than on white. The tint of the paper in one case supplying the half-tones, a few touches with white chalk for the high lights produces an effective drawing; while the same amount of work bestowed on white paper would only give a poor, meagre, washy result. It follows, therefore, that a short exposure on a fogged or toned plate produces a softer or more satisfactory picture than one taken with the same exposure on a plate not previously exposed to light. In the latter case a hard, under-exposed picture is the result. In using a previously-exposed plate it must always be necessary to supply the high lights by retouching on the negative.—I am, yours, &c., F. B.

March 14, 1874.

HOW TO CUT THE PAPER.—Here is our (Porter Brothers) method of cutting paper:—We have two pieces of zinc, the first of which is three and five-eighths inches, and the second two inches wide. Take a quarter-sheet of paper, lay it on the table, place the larger pattern on one edge, and cut off a strip the width of the pattern; lay it on as before and it will just half cover the remainder. Cut along the edge as before, and the quarter-sheet is in three strips, three and seven-eighths inches wide; then take the smaller pattern and cut across the strips in the same way, and you have pieces of paper just right for *cartes de visite*. We use a rolling glass cutter (Robinson's trimmer would probably be better), which does not go close to the pattern, so the latter are a little smaller than the paper is to be cut. If a cutter is used that will cut the paper as small as the patterns, so the latter should be three seven-eighths and two and a-half inches respectively. The above method gives forty-eight *cartes* out of a sheet, and is much more convenient than to fold the paper and then cut; besides, it leaves the edges smooth and straight, and does not break the paper.—*Phil. Phot.*

EXCHANGE COLUMN.

I will exchange a very handsome gold watch, Albert chain, and locket, value £10, for a 12 × 12 bellows-body camera; must be thoroughly good.—Address, H. Morris, 6, Lordship-terrace, Battersea Rise.

Wanted to exchange, from a dozen to a hundred first-class stereo. slides of Highland scenery for an equal number of other subjects, mounted or unmounted.—Address, D. Johnston, photographer, Forres, Morayshire, N.B.

Quarter-plate camera and portrait lens, half-plate glass bath in wood case, and several books, will be exchanged for 10 × 8 glass bath, 10 × 8 glass dishes, and glass plates 8½ × 6½.—Address, W. H. Page, 3, High-street, Wainfleet.

An excellent hand sewing machine (the "Royal Anchor"), complete, with all extras, cost £5 5s., little used, and quite equal to new, in exchange for a 12 × 10 portable camera or enlarging camera, or offers.—Address, Browning, photographer, Hanley.

A mantel-piece and fire grate (solid) in good condition, also whole-plate Kinnear camera and whole-plate Lerebours lens, in lock-up mahogany box, will be exchanged for anything of equal value.—Address, H. Dunbar, photographer, 74, Paradise-street, Liverpool.

I will exchange a capital nearly new tent, very strong and in first-rate condition, measuring when closed three feet two inches by two feet by two feet, for a bath 18 × 16, with water-tight top in perfect condition. Difference adjusted.—Address, G. A. B. H., 26, Terminus-road, Brighton.

Wanted, a binocular folding camera (Meagher's preferred), for 7¼ × 4¼ or 7¼ × 5 plates, with two or three double dark slides and lens by Ross, Grubb, or Dallmeyer, in exchange for a fine tourist's camera, two double dark slides and lens by Grubb, for 9 × 7 plates.—Address, J. E. Thornburn, Cockermouth.

ANSWERS TO CORRESPONDENTS.

Photographs Registered.—

John Horsburgh, Edinburgh.—*Portrait of the Rev. Dr. Macgregor.*

James Cooper, Darlington.—*Two Groups, entitled respectively "The Durham Thirteen" and "The County and Borough Members, Durham, 1874."*

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

James Barlas.—A private reply will be sent.

J. H. Waite.—We shall publish directions for developing in our next.

J. S. Hailes.—A single landscape lens is best for ordinary landscape purposes.

W. G.—The gentleman respecting whom you inquire is an inmate of a lunatic asylum.

E. Stephenson.—Odd numbers of the journals mentioned are of no value whatever.

Robinson Crusoe.—If you and we are thinking of the same lens the price is sixteen shillings.

J. Fletcher.—There is no copyright in the engraving, which you may reproduce on any desired scale.

W. T. W.—We shall write privately and give you details of the various chlorides. We shall also forward the negative.

Lewis T. Young (Philadelphia).—We shall be glad to hear of the result of your new trials with another saponaceous compound.

J. T. L.—We recommend sulphide of potassium (liver of sulphur), in preference to the other process for recovering silver from the fixing bath.

Henry Fisher.—There are two articles on studios in the present number. From the first of these you will obtain the information required.

R. H.—*Le Moniteur* will answer your purpose. We cannot supply the addresses of the proprietors of studios. You may obtain them from a Paris directory.

T. R. (Derby.)—The print enclosed is similar to those we have seen toned by the carbonate of soda toning bath. See Almanac for the present and last year.

J. W. F.—A glass rod can be easily bent to the required shape by holding it in the flame of a spirit lamp, or Bunsen burner, until it becomes of a dull-red colour.

S. H. F.—1. Try a mixture of lampblack and negative varnish.—2. Immerse the plates in a mixture of sulphuric acid and bichromate of potash, copiously diluted.

R. Kennett (Maddox-street).—Thanks for the printed directions for developing the gelatine plates. We shall publish them and report on the subject in our next.

Medicus Secundus.—Obtain a lens that will work with the greatest possible sharpness, and take all your negatives as sharp as you can. It is very easy, when printing, to introduce as much "diffusion" as you choose, by simply inserting one or more thicknesses of transparent sheet gelatine between the negative and the sensitive paper.

Photo.-Laundress.—To remove from linen the iron-moulds caused by the developer, apply a hot solution of oxalic acid, and keep the stain wet and hot for a short time.

A Practical Man.—Let your requirements determine the process most fitted for your adoption. We have freely stated the relative advantages of wet and dry processes.

O. S.—A patent was obtained about eight or nine years ago for the substitution of magnesia for lime in the oxyhydrogen light; but no patent that would interfere with this use of magnesia is now in existence.

Spots.—It is unfortunate that most of the printing paper in use is made by two manufacturers. The albumeniser is entirely at their mercy. We want more competition in this branch of manufacture.

Erin.—When again sending a negative enclose it in a small case or box, and not between two cards. We need scarcely add that the one forwarded was in fragments when we received it; hence we cannot offer any opinion with respect to its suitableness for enlarging.

J. T. P.—For outdoor portraiture prepare two screens—one opaque, and the other covered with white calico. Use these with judgment. We have tried the glass cutter with the steel wheel, and find that it answers the purpose well. The diamond mentioned we have not yet seen.

T. C. B.—The cause of the deposit you describe is the unsuitable condition of the silver bath. Make it neutral by adding just enough of a solution of carbonate of soda to render it opaline, then expose it to the sun for a day or two, filter, and afterwards add sufficient silver to bring it up to the proper strength.

W. Wedd (Mount Gambier).—The photograph enclosed is very nicely executed; with a little more force it would have been better. It is superior to those produced by the average of photographers in the country. The lens is barely up to what is required of it. Try the gelatine process described by Mr. King in our last Almanac.

The London Photographic Society.—In consequence of uncontrollable circumstances the meeting of this Society which was intended to have been held on Tuesday next, in connection with the revision of the laws, is postponed.

Process-mongers in America.—We imagine that we have somewhere read that Messrs. Robinson and Cherrill freely communicated to the public such discoveries as they have made in connection with photography. Having failed in finding any account of the discoveries which have been presented to the world by this firm, we had concluded that they were unreasonably modest in the selection of a channel through which to publish their discoveries. But from the advertising pages of an American contemporary we learn that, while by no means averse to imparting photographic knowledge, they have determined upon doing so only upon the *quid-pro-quo* principle, and have accordingly enrolled themselves in the once-despised class known as "process-mongers." It would appear that American photographers are not aware that practical tuition in photo-enamelling is given in this country for a couple of guineas, or that a manual of practical directions is being extensively sold for a few shillings; for we find that the firm above named offer to *American Photographers only*, for the sum of five thousand dollars, a speedy and certain method of making burnt-in enamel pictures! Europeans need not apply; but if fifty American photographers will come forward with one hundred dollars each, or a hundred with fifty dollars each, the time being limited to June 1st., detailed instructions will be given. We imagine this announcement will be received by English photographers with some degree of amazement.

METEOROLOGICAL REPORT,

For two Weeks ending March 18, 1874.

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

These Observations are Taken at 8.30 a.m.

March.	Bar.	Wind.	Wet Bulb.	Dry Bul	Max. Tem.	Min. Tem.	Remarks.
5	30·57	W	39	42	48	37	Dull
6	30·70	NNE	41	43	51	40	Dull
7	30·62	W	35	36	52	33	Fine
9	29·61	W	41	43	45	33	Rain
10	29·72	NW	—	30	38	27	Fine
11	29·98	NW	—	28	—	24	Snow
12	30·26	NW	—	31	44	26	Fine
13	30·36	NW	31	33	47	29	Fine
14	30·57	W	42	45	52	36	Fine
16	30·35	W	45	48	55	43	Fine
17	30·26	W	47	49	56	41	Rain
18	30·09	WSW	48	49	—	48	Rain

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 725. Vol. XXI.—MARCH 27, 1874.

FERROTYPES.

The origin of the word "ferrotype" will be immediately recognised in the Latin *ferrum* (iron). There are two distinctive characters of ferrotypes—one, and to which we think the term is most legitimately applied, being that in which a picture is formed by the decomposition of salts of iron. Of these there are several kinds, as will be seen from some articles we recently published on iron printing processes. The other class of ferrotype is that in which an iron plate—of course, well japanned—is used as a substitute for glass in the production of a collodion positive. This application of the term originated in America, where the production of direct camera positives, whether in the form of daguerreotypes, ambrotypes (that is, collodion positives on glass), or the ferrotypes under consideration at present, appears to have been prosecuted with more energy than in this country.

The manufacture of ferrotype plates seems to have been confined to America; we are certainly not aware of any European manufacturer of them. Under the designation of "melainotypes," positive collodion pictures on black japanned iron plates were used in Great Britain about eighteen years since; but they gradually died out in favour of glass plates where lightness and portability were of no account, or of black leather or leather cloth where flexibility was a desideratum.

The English agent (Mr. T. N. Gates) of the Phenix Plate Company, who are the makers of ferrotype plates, has given us specimens of this branch of manufacture. They are of a deep chocolate colour, and the surface is very even. Indeed the perfection to which the preparation of these plates has been brought is something wonderful.

Ferrotypes, then, are collodion positives on japanned metallic plates instead of on glass; this really constitutes all the difference between a "collodion positive" and a ferrotype. Very much may be said in favour of both. If the pictures are taken on glass they may be utilised as transparencies, from which can be obtained reproductions either on the same, on a smaller, or on a larger scale. If, on the other hand, they are taken on the japanned plates, they are ready at once to take their place as finished positive pictures, just as if they had been taken on glass; but, by a little exercise of ingenuity, they can be rendered more useful.

Our readers are aware that a picture on a blackened surface either of glass or of metal is wholly free from the particular kind of defect known as "blurring" or "halation"—for the simple reason that this drawback to the perfection of the image is inseparably connected with reflection from a surface behind that on which the image is impressed. Hence, as there is no reflecting surface behind that on which the image is received when a japanned plate is used, there can possibly be no blurring or halation, and the halation defects of a glass picture are quite unknown in a ferrotype. A collodion positive, therefore, intended for enlarging, if taken primarily on a ferrotype, will fulfil its purpose better than if taken on a glass plate. The removal of a film from the ferrotype plate is a matter of comparative ease; all that is necessary being to wash it over with a solution of citric or other similar acid, when the film will immediately become detached from the plate.

Ferrotype plates are exceedingly convenient when a portrait is wanted immediately, no time being required for printing. The ferrotype picture is finished off at once before the sitter takes his or her departure, and there is an end of the transaction.

This class of picture is being re-introduced into this country, and we believe it will obtain a permanent footing; for, with all its drawbacks, it has much in its favour. The rapidity with which the picture is finished, and also its freedom from any deleterious action upon the silver bath, commend the process to both the public and the photographer. The whites are scarcely so good, however, as those of pictures taken upon glass; but even the latter, at their best, present a somewhat dingy appearance compared with the purity of a picture on opal glass or paper. We were in hopes that some improvement might have been effected in this direction; but, as the result of many experiments both in bleaching the picture by "conversion" processes and in changing by heat the conditions under which the silver image meets the eye, we have, meanwhile, no special degree of success to record.

The re-introduction of ferrotypes in this country has our best wishes.

REMOVING THE SIZE FROM PAPER.

We supplement the observations we made last week on the production of transparent paper by a few words upon the removal of the size. Seeing that the finest specimen of transparent paper we have yet been able to make was obtained by the adoption of a sheet of thin albumenised paper, it may be desirable to describe the method by which we converted it into bibulous paper, so as, by freeing it from the albumen and the size, to lay its pores open to being impregnated with the balsam varnish of which we have already spoken.

The first thing to be done is to remove the albumen. This is effected by immersing the paper in water. As albumen is coagulated by hot water, but is quite soluble in cold, the temperature of the solvent is of some consequence. After a brief immersion in cold water the salted albumen with which the paper was surfaced will have been entirely removed, and after a subsequent rinsing it will be as clean, so far as albumen is concerned, as when it was received from the paper mills.

Although water dissolves the albumen it does not affect the sizing of the paper. To de-size it the method we adopt—whether the best or not we cannot say—is to pour hydrochloric acid into a flat vessel and to submerge the paper in this for a few seconds, then lifting it out by means of a pair of horn or ebonite tweezers and immediately transferring it to a vessel of water. By means of gentle agitation the acid is washed out of the pores of the paper—an operation sometimes facilitated by the addition of carbonate of soda, by which the free acid becomes eliminated, chloride of sodium being formed, which is easily removed.

When dried the paper will be found to be quite bibulous, and is then in the best condition to permit its being charged with the varnish by which it is to be rendered transparent.

It may be asked—Why not at once use plain instead of albumenised paper for this purpose? We reply—It would be better to do so, provided good non-albumenised paper were readily obtainable. Those who have it may use it; but the greater number of photographers, who possess only the albumenised paper, need not be debarred from using what they have got.

A word in conclusion concerning the paper itself. Writing paper, even when very thin, usually contains a large proportion of clay, added for the purpose of conferring weight and "body." Material of this kind is objectionable when transparency is desired; hence the advisability of using photographic paper, which is made of pure materials, and is, moreover, very fine in texture and homogeneous.

ON THE PHOTOGRAPHING OF FLUORESCENT SUBSTANCES.

It will be in the recollection of our readers that at the last meeting of the British Association Dr. Gladstone exhibited some photographs of fluorescent substances. One of these photographs was produced by tracing upon white paper a design with a solution of acid sulphate of quinine. As the quinine salt is practically colourless no design is apparent to the eye, but when photographed it comes out in bold relief. A solution of quinine and ink were then photographed in glass vessels, and were said to come out equally black. These striking experiments were at the time so novel that they created some considerable interest in the photographic world. Professor Tichborne, of Dublin, reopened the subject at a meeting of the Royal Dublin Society on the 16th ult., by exhibiting some photographs and detailing some experiments to determine how far fluorescence and phosphorescence would influence the tone of colour when photographed. The photographs had been executed with great care by Mr. John Robinson, of that city.

It is just possible that two blue fabrics having the same intensity of tone to the eye will, if one of the dyes be fluorescent, photograph differently as regards intensity. The probability of these results will be seen at once when we mention that some of the newest reds in the dyeing line are derived from anthracene, and that the most fluorescent substances yet noticed are some of the derivations of this anthracene. As the cause of fluorescence is that the refrangibility is lowered, it is probable that the change would be most marked in those shades which were richest in the chemical rays. However, the opinion of Professor Draper that all colours are more or less rich in photographic rays, and the experience of practical men that all colours will photograph, but that it is more a matter of relative quickness of effect, would point to the inference that a marked difference could exist in the lighter shade produced by even the least refrangible rays.

The definitions of fluorescence and phosphorescence are not very precise, and, as regards the latter, there is, in fact, a considerable field of exploration opened to the investigator. Certain solutions, when viewed by transmitted light, are colourless, but when exposed to direct light give rise to coloured rays. Acid solutions of quinine exhibit this phenomenon in a marked manner, whilst other coloured solutions give rise to rays other than those not absorbed in the general sense, and produce a dichroism; thus chlorophyll, a green solution, has a red fluorescence. Stokes thus describes fluorescence:—When a tube filled with an acid solution of quinine was placed in each of the colours of the prismatic spectrum throughout nearly the whole of the visible spectrum the light passed through the fluid as it would have done through so much water; but on arriving nearly at the violet end, or the refrangible extremity, a ghost-like gleam of pale-blue light shot right across the tube. In moving the tube the blue light, as it passed along the spectrum, increased in intensity for a short time, and then gradually decreased; but it was moved a considerable distance into the invisible spectrum before it entirely ceased, thus showing that the refrangibility of the rays is lowered until colour becomes sensible to the eyes. It is self-evident that the photographic effect will be more or less marked according to fluorescence or non-fluorescence of the substance emitting coloured rays, although it will not, perhaps, be particularly marked in the photographing of dark shades of orange or red. Fluorescence is extremely common, especially amongst organic substances, but is so feeble that it generally escapes notice.

Phosphorescence is a distinct phenomenon from the above, yet it seems to have some connection. Phosphorescent substances, although they do not emit light in the dark, yet, after exposure to the solar rays, continue, without any chemical change taking place, to give out light for some considerable time. Each of these particular phosphorescent substances emits a light, or lights, peculiar to itself. Thus sulphide of calcium emits a light, under certain conditions, beautifully rich in blue and violet rays. Sulphide of barium, on the other hand, is capable of giving off red rays, but generally fine golden rays. According to the researches of E. Becquerel, whose opinion we are bound to treat with the greatest respect, the phenomena of phosphorescence or fluorescence are due to the same cause. Nitrate of uranium and quinine, for instance, are both phosphorescent and fluorescent, and emit in both conditions light of the same colour; but other bodies are highly phosphorescent but not fluorescent.

The mineral and organic world are equally rich in phosphorescent substances. The artificially-prepared sulphides of the alkaline earths exhibit it in the greatest perfection. Diamonds, fluor spar and crystallised varieties of the earth, alumina, nitrate of calcium, salts of alkalies and alkaline earths, sugar, tartaric acid, and a host of organic substances exhibit it in a feeble degree—even paper itself. It is curious, however, to observe that the electric light is not sufficiently strong in phosphorogenic rays (rays that induce phosphorescence) to penetrate the thinnest piece of glass. Rock crystal will, however, allow them to pass. Thus if the electric spark be passed across a sulphide over part of which is interposed a plate of glass and over the other a plate of rock crystal, only the portions covered by the latter will become phosphorescent; but both good photographic sunlight and the magnesium light are capable of passing through the glass and inducing phosphorescence. The photographic action of these two classes of substances we must reserve for a future article, as we have already exceeded the space at our disposal this week.

TRANSFERRING VARNISHED NEGATIVE FILMS.

Any suggestions tending to simplify or facilitate the application of the mechanical processes of photography must certainly be hailed with interest by a large section of the photographic public, since there cannot be a shadow of doubt as to the importance of these methods of reproduction. From the descriptions of these processes given at various times it will be seen that a reversed negative must be used; and this, to one about to utilise old and varnished negatives, is a difficulty to be encountered at the very commencement of a mechanical printing career. When a negative has not been taken in a reversed position by the aid of prism, mirror, or reversal of the plate so as to have the collodionised side nearest the back of the camera, it becomes necessary to remove the film from the glass so as to be used as a pellicle.

It is a very easy matter to effect the transference from glass of an unvarnished negative; but when the subject of transfer is an old and well-varnished picture the proceeding must be somewhat modified. In the chapter *On the Transferring of Varnished and Unvarnished Negative Films*, in our Almanac for last year, detailed directions for effecting the safe removal of both classes of negative films were given, the varnish in the case of the former being removed by means of a special solvent.

In a foreign contemporary *(Photographisches Archiv)* another method is described by which the removal of the varnish is said to be rendered unnecessary. The method proposed is to use a solution of gelatine containing acetic acid and soap wherewith to coat the varnished film previous to applying the transfer collodion. The proportions given are as follow:—

Gelatine	60 parts.
Acetic acid	90 „
Water	180 „
Ordinary soap	½ part.

The foregoing ingredients are mixed together, and then poured quickly over the varnished film in such a way that every part of the surface is uniformly covered, and no portion covered a second time. The superfluous liquid is poured off and thrown away, for it cannot be utilised again for the same purpose. The film is then allowed to dry, and, when perfectly desiccated, some thick uniodised collodion, to which a little castor oil has been added, is poured over it. This "*collodion cuir*" having dried uniformly will be found to peel off readily, bringing the whole of the image with it. Should it be found upon trial to be too thin a second coating of gelatine solution—but this time *without soap*—may be applied, and another coating of collodion will produce a thicker and more solid film.

The writer concludes his paper by stating that he has stripped a large number of negatives, all of which had been previously varnished, without having met with a single mishap.

To those who have never experimented with any of the mechanical or carbon printing processes a facility for transferring negatives from the glass plates on which they have been originally taken may be of little interest; but to those who see that the future of photography must lie in this direction another ready means of reversing a negative which has once been varnished will be a considerable boon.

The fact must not be lost sight of that negatives thus stripped from the glass are not rendered useless for silver printing, as is the case when they are reversed upon the glass plate; for the compound film being so thin permits of printing from either side of it, and, therefore, prints may be made for comparison by the old as well as by the new method, thus affording a crucial test to which their merits may fairly be subjected.

ALKALINE PYROGALLIC DEVELOPMENT.

In a letter received from Mr. Reuben Mitchell he communicates the result of several experiments he made about three years ago with a view to rendering the development of dry plates as simple and satisfactory as possible. In doing so he was led to discard the use of bromide, which in his hands was useless and injurious. Mr. Mitchell gives the following as his *modus operandi*:—

"I do not content myself with simply wetting the plate before development, but give it a good washing under the tap. I place the plate on a holder and have a three-grain solution of pyro. filtered, and a dropping-bottle with strong liquor ammonia at hand. I take a developing cup and pour as much of the three-grain pyro. solution in as will flow on the plate, rock it backwards and forwards a few times and return it to the cup, adding one drop of ammonia from the dropping-bottle, together with more pyro.—about as much as will flow on the plate well. To prevent marking I keep it moving from end to end till the whole of the detail is fairly visible; I then wash off the ammonia well from both sides of the plate if the film will allow it without danger or injury. If there be any risk, wash with care and flow the surface with a little of the pyro. solution to neutralise the ammonia.

"Intensifying solution:—

Nitrate of silver	20 grains,
Citric acid	20 „
Water	1 ounce,

in a developing bottle.

"Take a clean cup with as much of the three-grain pyro. solution as will cover the plate; flow it on and return it to the cup. Now add one or two drops of the acid silver, and return it to the plate. If the exposure have been rightly timed the development will soon be complete.

"I have successfully developed dry plates with the above, prepared by a variety of formulæ, without the slightest taint of fog."

We have been favoured with slips from the *Calcutta Englishman* containing a long notice of the Exhibition of the Bengal Photographic Society, which seems to have been a very successful one. The gold medal offered by the Viceroy for the best picture in the Exhibition has been awarded to Messrs. Robinson and Cherrill for their picture of *Preparing Flowers for the Market*; the silver medal for the best series of landscapes not taken in India to Mr. F. Beasley; and an extra silver medal for landscapes to the School of Military Engineering, Chatham. Mr. G. L. Kemp is to receive the silver medal for a series of views in Upper India. A gold medal has been awarded to Messrs. Bourne and Shepherd for a collection of views in Burmah and Rajpootana. A silver medal has been also awarded to this firm for photographs of antiquities, and a third medal of silver for the best portraits taken in India. A bronze medal has been adjudged to Major H. L. Millett for a collection of views of Chamba. To Mr. Woodbury has been awarded a silver medal for Woodburytypes exhibited by him; and a similar medal to the Photographic Branch of the Surveyor-General's Office, for several specimens of photocollotypes illustrating the value of the process for various purposes. Mr. Westfield (of India) is to receive a silver medal for his portraits of children. Silver medals are also awarded to Mr. Noone for his reproduction of works of art in the Dresden Gallery, and to Mr. England for photographs of statuary. We shall probably next week give some extracts from the criticisms bestowed on the pictures exhibited.

EMULSIONS OF SILVER BROMIDE AND SILVER CHLORIDE.*

In the next series of experiments an effort was made to obtain greater density and sensitiveness. These were conducted with silver bromide only, precipitated in presence of excess of silver salt. No chloride was used, and no silver nitrate in excess. After the emulsion had stood twelve hours various substances were introduced into it; and, after standing twenty-four hours more, plates were made and sensitised without previous washing, because no free silver nitrate was present (see No. 4, first part).

The substances introduced were—1. Xyloidine. 2. Glycerine. 3. Resin. 4. Tannin. These plates were tried with various sensitising baths, but the conclusion come to was that these substances introduced into the emulsion were totally without effect, except, indeed, *tannin*, which diminished sensitiveness.

In this set of experiments a considerable number of plates were exposed in the camera, and the conclusion come to was that emulsions prepared in this way were not necessarily less sensitive than those made by the ordinary plan; for the details in the shadows were often as good as those in companion plates prepared for comparison with emulsions made in the usual way. These comparison plates received equal exposures, immediately following or preceding, on selected days of uniform light; and I repeat that the comparison showed that, with proper precautions, *as high a degree of sensitiveness could be obtained, and was obtained, in the new way as in the old.*

The next set of experiments made was to test the effect of using an alkaline collodion. The form of treatment made use of—the separate precipitation of silver bromide—enables one to experiment more widely, and introduce agents into the collodion not admissible in the ordinary process. Four drops of liquid ammonia were added to the ounce of collodion. This had the effect of making it as thin as water; nevertheless, when extended on glass, it gave a fine, reticulated mottling. The plates, though treated in various ways, all gave poor results.

In the next series a very careful comparison was again made between emulsions containing silver chloride with the bromide and those containing bromide only. It does not seem worth while to cite all these separately; it is sufficient to say that the evidence was invariably and overwhelmingly in favour of the addition of chloride, and justified me in what I said in one of the articles in which I originally proposed this change of treatment—that the time would come when the utility of silver chloride in bromide emulsions would be as generally recognised as that of silver bromide in connection with iodide in wet plates. In every case, and with very varied after-treatment, the chloro-bromide plates showed themselves superior to the plain bromide plates.

Finally: another set of twelve $6\frac{1}{2} \times 8\frac{1}{2}$ plates—the size used in all these experiments—was made. I need not repeat the result in each; the whole is summed up in my note-book as follows:—

1. *Free Silver Nitrate in Collodion without Chloride.*—Result always bad—either veiled or dense fog; sometimes no image whatever.

2. *Silver Bromide Precipitated in Presence of Excess of Alkaline Bromide or of Silver Nitrate respectively.*—The difference of effect was always very marked, whether or not free silver nitrate was added to the collodion.

* Concluded from page 134.

In one of the early experiments cited it was mentioned that, when silver bromide was precipitated in presence of excess of alkaline bromide, and then emulsified with a collodion containing one grain to the ounce of free silver nitrate, no image at all was obtained. That experiment was now repeated on three plates, two of which were, as before, sensitised with a bath of litmus preservative. The third was sensitised on a bath of decoction of cloves. The two first gave, as before, no image at all; the latter gave an image showing some detail, but a good deal veiled. This was curious, because, for the most part, litmus* gives more sensitiveness than cloves. It also shows how much the sensitising bath affects the result.

3. *Absence of Free Silver Nitrate in Collodion.*—In this case tolerable images were got with silver bromide precipitated in presence of either excess of alkaline bromide or of silver nitrate. There was always this marked difference—that where bromide was in excess the plates were cleanest, where silver was in excess they were most sensitive and intense.

4. *Use of Chloride.*—The remark in my note-book in reference to this point is that *none* of the plates made without chloride *approached* those made with it, but were always "much inferior."

Recapitulation.—The results obtained from the experiments described in this and the former part may be summed up as follows:—

1. An emulsion of silver bromide precipitated in presence of excess of alkaline bromide, and then used without any free silver nitrate being present, gives tolerable images; the plates work cleanly, but are very deficient in sensitiveness. When free silver nitrate was present the plates fogged, often without giving any image at all. Of the four plates tried this way only one gave an image. Much depends here on the sensitising bath.

2. When the silver bromide is precipitated in the presence of free silver nitrate the results are not materially different. If the collodion contain no free silver nitrate tolerable images are obtained—more sensitive and intense than No. 1, but hardly as clean. If, on the other hand, the collodion contain even a small portion of free silver nitrate fog is inevitable.

3. But by the introduction of silver chloride, whether by adding a chloride to the collodion or introducing into it a few drops of *aqua regia*, a complete change takes place. We can now introduce not merely a trace, but any desired quantity, of silver nitrate in excess without danger of fog, and with great increase of sensitiveness and density.

I believe I may say that these results correspond pretty closely with the explanations and views I had previously offered in connection with my chloro-bromide process, now so largely used. In emulsions made in the ordinary way some doubt may exist as to what reactions have taken place in so complex a mixture. I think I may say that in these investigations those difficulties have been set aside, and an opportunity has been obtained of fixing with some certainty the characteristics of the emulsion process, especially the influence exerted by free alkaline bromide, free silver nitrate, and silver chloride. It has also been shown that silver bromide precipitated from aqueous solutions itself acts powerfully upon collodion, in the complete absence of both alkaline bromide and excess of silver nitrate.

M. Carey Lea.

MEMORANDA ON THE MULTIPLYING OF NEGATIVES AND ON PERMANENT PRINTING.

The process known in connection with the production of photo-enamels as the "dusting on" process has been made use of in an ingenious manner by Herr Jacobi for the production of *negatives from negatives* by a single operation, and he has thus described his method of procedure.

Using chalk as the powder to be dusted on, he obtained very favourable results. He found, however, that all the samples of chalk he got were not alike; some had a greenish tinge, and materially retarded the light and made the pictures harder than ever. A soft, thin negative is, however, absolutely essential to obtaining a good print in carbon. He therefore tried some plumbago, which pleased him so thoroughly that he now uses nothing else. The use of such a plan seems to be not only the softening of the image, but the giving of a fine grain to the positive as well.

The method by which Herr Jacobi manages to work this plan is simple enough. He prepares a mixture of one part of gum arabic, forty parts of water, two parts of sugar, seven and a-half parts of a solution of bichromate of potash of the strength of one part of potash to ten parts of water, and one and a-half part of honey diluted with twice its weight of water. The condition of the atmosphere must be taken into account in adding the sugar and honey, which must be varied according to its moisture or otherwise. This mixture is poured, when warm, over a clean plate also warmed, so as to give as thin and uniform a film as possible; it is then dried quickly and exposed under the negative, which should also be slightly warm. After sufficient exposure the plate is taken out and the image developed under the brush by the application of the powder. This is a part of the process which demands great care and patience so as to avoid patchiness, and if the dark room be in the least damp the picture will be smeared. When it is all completed in this way the image is coated with plain collodion, washed, and dried for varnishing.

Original negatives printed by this method must of necessity be taken on perfectly-flat glass—by preference on patent plate—otherwise the sharpness is sure in some parts to be lost. In all cases, however, where it is necessary to take a new original negative the plate should be coated first with india-rubber solution (one part of rubber to 150 of benzine). This frees it from all danger of spots, and lightens very materially the labour of transfer should it be necessary.

Herr Jacobi declares that many years' experience leads him to prefer hyposulphite of soda as a fixing agent to cyanide of potassium. A great many beautiful negatives which he was in the habit of taking duplicates from as occasion required have become so dense that he must give up all hopes of making further use of them, and he ascribes this largely to the use of cyanide as a fixing agent, negatives so fixed being the worst for going wrong. Quoting a saying of Herr Reich's with approval—that it is ten times easier to take a passable negative than to prepare a plate for carbon printing—he says that the whole series of operations between the taking of the negative and the production of the finished print require a great deal of care and patience, and the utmost caution is necessary. As all men do not possess these qualities it often happens that people fail. They go a little way, find it difficult, and turn back again to the old ruts, content with silver printing. But, for all that, it is a fact that lichtdruck now runs silver printing very close, and that being so it seems singular that large firms should still persist in sending out, year by year, thousands upon thousands of prints which, after a little exposure in dealers' windows, begin to look yellow and spotty, and from which calamity their higher price by no means saves them. Surely it would be at once more economical and more honourable, Herr Jacobi thinks, if large houses would more generally set the example and make "permanence" their motto. Some people seem to fear that they would lose their trade if they guaranteed their prints to be imperishable. It is his opinion that the new process will now soon assert its supremacy, and that before its advance the older processes must recede and become obsolete.

ON TAKING LIFE-SIZE HEADS DIRECT.

The various methods of taking life-size heads by means of enlargement from a negative of *carte* or cabinet size have been fully discussed lately in the columns of this Journal, but the method of taking them direct at one operation has received but little attention; it has, in fact, been generally condemned, as yielding an inferior result.

Without entering into the comparative merits of the two different systems I will endeavour to show how I think the direct method may be greatly simplified and made to yield better results.

In the first place, the question has been asked—What is meant by a life-size head? The answer I apprehend to be simple enough, viz., a portrait measuring the same size as the original. If the head of the sitter measure nine inches the head in the portrait must measure nine inches also; if seven inches, seven, and so on.

Now, by the law of conjugate foci, when an object is copied full size the lens must be midway between the object and the image, and the equivalent solar focus of the lens must be one-half the distance of the lens from the object. Thus, in taking a life-size head direct in the camera, if the lens be six feet distant from the sitter, its solar focus must be three feet, the camera must be six feet long, and the ground glass six feet distance from the lens.

Under these circumstances the studio ought to be at least sixteen feet long, because there must be twelve feet between the sitter and the ground glass.

Let us now see what will be the best kind of lens to employ. Is the operator obliged to go to the expense of £50 for a large portrait lens, or might not a lens be made for a couple of pounds which would answer his purpose equally well? This, at starting, is evidently a very important question, and I will endeavour to discuss it fairly and to the best of my ability.

* In speaking of the use of litmus I wish here to repeat what I have said elsewhere, that I have ceased to use it in the field, although it gives beautiful results, because the images, if not developed a very few days after exposure, fade out rapidly.

When an object is copied full-size by means of a lens it is evident that the lens should be symmetrical, because it is exactly midway between the object and the image, and the pencils on either side of it will be equal cones. But a portrait lens is not symmetrical, since the back and front lenses are different; it cannot, therefore, be the best possible optical arrangement for our present purpose.

Would, then, a symmetrical doublet be better, with its stop in the middle? Or might not a single achromatic double-convex lens answer the purpose, without any stop, and with its back and front surfaces made with equal radii?

After a good deal of careful consideration I am inclined to think that a double convex lens, made by cementing a double concave of flint between two crowns, *would* answer the purpose, because its diameter need not exceed four inches, and the obliquity of the extreme pencil being only about five degrees would not trouble us, and might be disregarded.

Under these circumstances our pencils would be six feet long and four inches wide at the base, so that the ratio of focal length to aperture would be eighteen. The lens would, therefore, work as quickly as a single view lens five inches focus and quarter-inch stop.

Would this be quick enough for the studio? I fancy so, because the face, being a light object, would not require an exposure of more than thirty seconds if the chemicals were in good order; and it might then be shaded by holding a board covered with black velvet before it whilst the dress was receiving a little longer exposure—say two minutes. Of course a change of expression behind the black board would not signify.

Let us next consider what quality of definition would be likely to be obtained with such a lens as I propose.

The object-glass of my astronomical telescope is four and one-eighth inches aperture, and its focal length is six feet. Here, then, is some sort of guide for us, but I admit that the conditions are not exactly the same in the two cases, although the pencils are the same size after refraction through the lens. Now, my object-glass, used with full aperture, gives an image which will bear the high magnification of a powerful eyepiece, and which will then show the pole star double, and do all sorts of wonderful things. Surely, then, making all allowance for the difference of conditions in the two cases, the lens which I propose ought to give much better definition than what is obtained by enlarging a small negative eight or nine times linear by any of the methods now employed; for, if we examine such enlargements carefully, we find their definition to be nowhere, from an *optical* point of view, although it may be good enough to satisfy the eye of an artist.

The symmetrical double convex lens which I have now suggested may be rigidly fixed in the front of a camera of plain wood, five feet long, and with a short sliding body to pull out to the required length. A simple flap-shutter in front of the lens would suffice. The entire apparatus, lens and dark slide included, need not, I imagine, cost more than five pounds. This would be a great improvement upon the monster portrait lens, which no intelligent optician, I should imagine, could ever seriously recommend for this purpose, except to fill his own pocket at the expense of his customer.

The reader can easily form a very good idea of the exposure necessary with such a lens as I describe by taking a face in the studio with a view lens five inches focus and quarter-inch stop, or with a portrait lens stopped down to the same ratio. It must be remembered that, owing to the numerous reflecting surfaces of a portrait lens, a great deal of the light is lost, and that a single lens works much quicker, other things being the same. With a view lens stopped down to what I say, I have repeatedly taken, by the common wet process, views in which the darkest details of foliage in shadow have been fully brought out in twenty or thirty seconds. Now, I do not believe that a human face, in the light of a common studio, would require with the same lens a longer exposure than this; but that could easily be ascertained. It is generally the dark *dress* of the sitter, and not the face, which requires the length of exposure that is commonly given to portraits.

A word or two now about the practical parts of taking and retouching the negative.

The background should be quite plain and rather dark—*à la* Titian—and the portrait should only include the head and the upper part of the shoulders.

In order to smooth down the coarseness of texture of the skin, hide freckles, &c., a sheet of thin paper may be attached to the back of the negative, and this may be painted in india-ink in those parts where higher lights and greater smoothness are required in the print, at the same time that more intense blacks may be got in parts by putting touches of varnish upon the paper in those parts, so as to render them more transparent. The background may also be graduated a little by these means. Those parts of the portrait where great sharpness is required—in the eyes, for instance—may be retouched in lead pencil upon the film. If the artist should wish to create a little sensation at a meeting of a photographic society he may remove the paper screen from the back of the negative, and then exhibit the latter, saying—"Look how very little my negatives are retouched!"

The negative should, of course, be a rather feeble one. It must be developed with a large quantity of a weak solution of iron, and then be brought up afterwards to the right density by very careful intensification.

Such are the suggestions which I have to offer, and I hope they may be found to contain a germ of novelty as well as practical utility. THOMAS SUTTON, B.A.

ON STABLE PHOTOGRAPHIC FILMS.

THE journal (*Helios*) so long carried on with success—at least, in a scientific point of view—by Hermann Krone, of Dresden, and in which he has published much interesting memoranda connected with photography and light, has for the present ceased to appear. Herr Krone finds himself too much occupied with operations connected with the forthcoming transit of Venus to be able to issue it. We shall hope, however, that he will still continue to favour the public with his observations from time to time in one or other of the excellent German photographic journals which still exist. Meanwhile we observe in the last number of the Berlin *Mittheilungen* the first part of a paper from his hand upon the above subject, a summary of which, we think, may be interesting to our readers.

He observes that the old Taupenôt process—iodised collodion silvered and covered with an after-silvered coating of iodised albumen—in spite of its many advantages, and though the plates prepared by it are so durable, has yet the drawback of being insensitive, owing to the thickness of the coating of albumen, which also militates against its durability; for the more albumen there is on a plate the more substance is there for the formation of silver sulphides. These drawbacks Fothergill sought to overcome by a subsequent washing off of the albumen, so that there should remain in the film only a fine residuum of it adhering by virtue of its capillarity to the collodion, and which would serve during development and intensification, as also after lighting, for the formation of albuminate of silver. On the heightening of the sensitiveness of the collodion-formed silver film such a superstratum has no influence whatever, although from the stronger appearance of the image the sensitiveness of the Fothergill film is probably strengthened by the repeated treatment of it with silver. There is thus formed silver albuminate within the iodised collodion silver film, and this acts during the exposure on the iodide of silver, owing to a tendency to hold and absorb iodine as a sort of sensitising element; it takes, in fact, the part that free nitrate of silver takes in the wet process. Besides this, better half-tones are obtained, for the silver albuminate is itself chemically and photographically sensitive to light. There is also the advantage of durability, which the film gains through the presence of albumen in this insoluble condition.

This plan was first practised systematically by Mr. Wm. England, and the many excellent pictures of Savoy and Switzerland which he took with it show conclusively the practicability of the process; they are equal to what can be obtained with wet films, and but for the different colour of the negatives taken by the two processes there would be no distinguishing them. In order to attain success like that, however, various precautionary measures are necessary, the neglect of which is likely to be severely visited on the luckless operator. It is an excellent but most difficult method.

The reason of this is easily set forth. The presence of a sulphur-containing body in the sensitive film, from the facilities it offers for the formation of sulphate of silver, is always a source of danger. On account of its sulphur albumen is thus a dangerous substance, and one that requires to be used in photography with the utmost caution. In the first place, silver sulphates are created in the silver bath by the mere contact of it with this substance. This sulphate is at first held entirely in solution, and then when its amount increases is held in suspension, while, finally, it becomes deposited upon the films immersed in the bath should it continue to be used. The two methods, therefore—the coating of a series of washed collodio-albumen plates in a bath, new, to begin with, but not changed, and the *overflowing* of the same kind of plates with a silver solution which is new and never used twice—are not similar in their results. In the former case, the first plates done will be excellent, will keep a long time, be very sensitive, and give very good results in every way; but the later-prepared will gradually deteriorate, will develope more slowly, with much less richness of detail, and, after fixing, will show a ground tone of yellowish hue, as if it were still in its unexposed state. The plates range through all degrees, of course, to this worst, but this is the tendency. If an old bath be used to begin with things are worse—the plates will hardly keep a day, appear of a dark-brown hue, and develope with a strong yellow tinge in the half-tones. Mixing new bath solution with such an old bath does not mend matters. As help in extremity it is possible to use glacial acetic acid, but it is at the cost of the, without that, already sufficiently-lowered sensitiveness, and a passable result is even then only obtained if exposure take place soon after drying and when plates are developed the same day. Through the addition of acid the ruinous but already begun formation of sulphate of silver may be retarded, but the evil will not thereby be removed. It is simply here, as in all other photographic processes, a retardent.

Nothing can be more important than the lessening, as much as possible, of the quantity of acid added to the silver bath. The less that quantity is the more sensitive will be the plate, but, also, the less keepable. The right mean must, therefore, be found, if possible; for it is of the highest importance in a climate such as ours to have plates that will keep, and that also will not appreciably lose their sensitiveness in keeping. But a rigid formula cannot be given; the quantity of acid must be determined by many things—by the condition of the albumen, of the washing water, when one is preparing the plates in a strange place, &c. For pure white of an egg, out of fresh eggs, with clean spring water for washing, four drops of acid to every ounce of a six-per-cent. new silver bath will be enough; but if the eggs are more than eight days old, when the whites will show of a deeper (more golden) yellow colour, and if one has reason to mistrust the purity of the water, double that quantity may need to be used. In general, too much acid lessens the sensitiveness and renders detail in the shadows impossible.

Unfortunately it often happens that one has to work with very indifferent water. To a foreign expedition—such as any of those going to observe the coming eclipse—this is of extreme importance. In such cases, where water may be very foul, and totally unpromisable in better condition, all ordinary calculations are upset, and good, durable plates and unfogged pictures may become an impossibility. Freshly-prepared plates exposed immediately after drying may in such cases show at once the presence of sulphur in the film. In developing with plain pyrogallic acid they will show, probably, a deposit, and that even before intensification of the yellow sulphate of silver. The same will appear if the plates are tested with developer without exposure. In a recent instance which happened to Herr Krone, where he had to use water spoiled in some way by asphalte, he exposed a plate three times as long as usual, developed it with plain pyrogallic, to which some silver was added at the second overflowing. The image appeared very clean and full of detail within half-a-minute, and was, at the end of two minutes, fully developed. After a slight wash, an intensifier consisting of silver and acidified pyrogallic was applied, washed off, and the image fixed in a concentrated solution of hyposulphite of soda. Thus, by using the old method by which wet plates were developed, and by the extreme length of exposure, he got over the danger from the extra acid in some degree.

Herr Krone cannot recommend the use of the alkaline method of development for collodio-albumen plates; for the tendency which the albumen then shows to dissolve stimulates the formation of the silver sulphide during the rapid precipitation of the metal. In general, the presence of acid in the developer keeps the shadows clear. Upon this, however, as upon whether this or that acid shall be used, the important question of the duration of exposure hangs. A single drop of acetic acid in one hundred cubic centimetres of pyrogallic developer prolongs exposure by at least as much again; a drop of citric acid demands three times as long as is required with plain pyrogallic acid to which neither acid nor silver has been added. If acid, of whatever kind, be added to the pyrogallic at the commencement of the development not a trace of the image will usually appear. That is, indeed, the true photographic developing process which acts in a mechanical way on the light-altered part of the film, and deposits, by means of the pyrogallic, the instantly-reduced silver *in statu nascente*, and when the acid acts as a shield to the places unaffected. But this is a dry process without free silver, and where the image, in consequence, is best developed without acid in the developer; here the plain pyrogallic acid acts as an iodide-absorbing body on the light-modified film. The silver is by its presence further reduced, according to the proportion of the light's action, to a visible image so long as the minute quantity which is in the film lasts. Thus a thin detailed image is obtained, which must be strengthened in the usual way. This, therefore, is purely a chemical process of development; while the other is a mechanical one, which is indeed required here for strengthening the image, but not for development. Were all precautions taken and means adopted of the kind here hinted at there would be no cause to complain of this process, which would give the most delicate detail of light and shade with a comparatively short exposure.

A STRAY THOUGHT OR TWO ABOUT PHOTOGRAPHS.

To begin with—What is a perfectly-good photographic picture? This is a question much more easily asked than answered, when some deny the possibility of a photograph being a picture at all; at any rate, there exists a very wide difference of opinion on the subject. Most people think they know what it is, but would be terribly puzzled to define in so many words what qualities a perfect photograph should possess, or to point out the more refined qualities if they saw one. They might possibly enumerate a string of platitudes about sharpness, brilliance, modelling, and soforth, with really about as much idea of the meaning of the phrases as Chrysos had when he found fault with the light and shade and indifferent scumbling of Pygmalion's statue. "If this is thus, why so thusly?" as our late friend Artemus Ward puts it. It may be summed up by saying that it is owing to a deficiency of art education among photographers—a deficiency that sadly requires remedying by the establishment of schools of art, where camera and chemicals would be substituted for the palette and brush. Till these happy days come individual improvement must be attained by the careful study of works of art by men of acknowledged reputation, carefully noting the adaptation and arrangement of the light and shade for the production of certain effects—the variety of tone in the modelling. Modelling, by-the-bye, is very much too often represented by even half-tint in the photograph, the much-prized ivory appearance being utterly at variance with truth and nature, causing the skin to look like a polished marble slab instead of a soft, living, velvety surface with a wreath of delicate colour varying with every movement of muscle or change of position.

What photographer with genuine art feelings could see Gustave Doré's *Prætorium* picture without advantage? What wonderful contrast of action, arrangement of lines, and power of effect are there! The numerous incidents are marvellous in their variety—studies of themselves—yet all subservient to the leading idea. All are worked out to give force and dignity to the principal figure. Notice how wonderfully the light and shade is managed, although there are no Rembrandtesque effects. After carefully examining it what photographer could say there is no advantage in studying such a marvellous work? Are not the arrangement of the lines, the grouping of the figures, the management of *chiaroscuro*, the variety of accessories (none obtrusive, but everything kept carefully subordinate to the principal light) of advantage to the photographer? I certainly think that the study of pictures is almost more important to the uneducated photographer than study from the life, inasmuch as the fact of artistic arrangement is more easily grasped and remembered in a picture than in reality, as the wonderful kaleidoscopic variety and change in living models is apt to confuse. The profitable study of models can scarcely be pursued without training under skilled direction, for it is impossible to see to any good purpose what is not understood. Some special qualities will abound in certain pictures and some in others of a different kind, the study of which involuntarily educates the eye and imparts a knowledge that will impart much help in many difficulties, and also favourably influence after-work.

Utterly incompetent people, speaking artistically, think themselves quite capable of criticising a photograph, and look on this "child of the sun" as a dwarf trying to become a giant—a sort of adventitious bud that will never grow up into a strong and healthy branch, or be anything more than a familiar curiosity. I am not now alluding to photography in any other than its art phases, as it is already a giant in relation to manufactures and commerce. These critics—and there are many of them—very injuriously affect photographers by engendering the idea that all this abstruse study is so much time thrown away, and that the quarry is not worth the trouble. Such influences cause them to run in a certain groove and never get out of it.

Let us now consider what is a perfectly-good photographic picture, such as is capable of being produced by our present known appliances.

It does not consist of a perfect negative. A perfect negative is by no means of necessity a good picture, nor is a perfectly-printed and toned positive copy of such a negative a good picture, although both are absolutely necessary for the perfect result. They must be supplemented by additional painting by the light alone as one might use a brush and colour to tone down, deepen, or add shadows where required; in fact, to harmonise and revise the whole, to produce harmony of contrast, and to add brilliance of *chiaroscuro* where it does not exist or is not sufficiently made out on the original negative. We all know that a medium quality of negatives, well manipulated in printing, will produce results far superior to a splendid negative badly printed. With the knowledge of this it seems a curious anomaly that absolutely the most ignorant of the photographic brotherhood are deputed to carry out the printing, and the printer is considered lowest in the scale of photographic operators. The ultimate result, the final goal—to attain which money is lavishly expended, for which the scientific man, the chemist, and the optician labour—is thus rendered abortive. We must think how very inadequate, in an artistic sense, are the results of all this brain-cudgelling and expenditure when we see the tons of rubbish that are yearly turned out. It should not be so, but when we consider the law of physics—that the strength of the chain is only equal to its weakest link—there is really not much to be surprised at; and the weakest link has hitherto been the printing. All the expenditure of valuable skill is absolute and entire waste if the printing be badly done. Notwithstanding this fact, it is only of late years that this very obvious matter has been considered at all, and even now is only partially so. Any incompetent loon is thought sufficient for the printing. An errand boy, with two or three days' instruction in the necessary manipulations, is presumed to be a photographic printer, and after a few years of blundering along merges into a full-blown "photographic artist" forsooth! I think the phrase "photographic artisan" would be more appropriate. Such as these, however, produce millions of photographs in the course of the year, amass a sum of money, get from canvas blouses into broadcloth, and know no more of a good photographic picture at the end of the time than they did at the beginning. A clear, sharp image—with "everything there, you see"—is the height of their knowledge and the whole of their ambition.

I think that, providing it be worth while to press scientific men, artists, chemists, and opticians into the service of photography, it is worth while to use as much skill in the final process of printing as in any of the other operations connected with the art—that, in order to produce the best results, it is an absolute necessity that an artist, and not an artisan, have the management of it. It is a mystery to me why this principle has not been acted on from the first; and it is quite as evident that, until the printing department be considered sufficiently important to employ artistically-educated persons, we shall, despite every other advance, remain practically in the same unsatisfactory groove. Till then we must wait for our thoroughly-good photographic pictures. E. DUNMORE.

NOTES FROM THE *MONITEUR.*

M. FARGIER has made a further communication upon his process, published in 1872, for producing carbon pictures. He then wrote:—

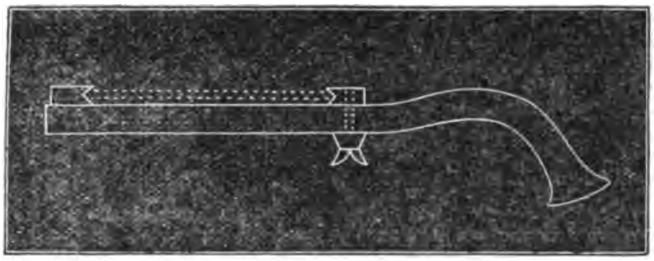
"A saline solution is prepared—in a manner the details of which cannot yet be given—and poured into a dish. On this bath a sheet of ordinary paper is floated, withdrawn, and allowed to dry, when it is exposed under the negative in the printing-frame. The image shows itself slowly, and the progress of the impression may be easily watched. When it is judged of sufficient depth the picture is taken out and placed on a bath of coloured gelatine, the same as is used for ordinary carbon printing. The gelatine adheres only on the parts impressed by the light, and when it has done so sufficiently the print has only to be washed and dried, when it is finished."

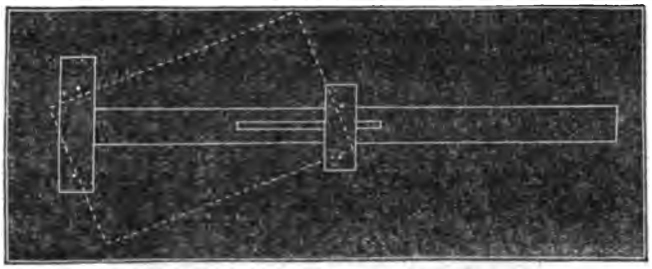
To the remarks then published M. Fargier now adds a supplement, in which he states that the saline solution to which he alluded is a solution of one and a-quarter drachm of perchloride of iron, and the same quantity of citric acid in twenty-five drachms of water. The gelatine *mixtion* is coloured with the addition of a drop of bichromate to every half-drachm. There is also another method of working. Instead of the plain paper, a sheet of albumenised paper is laid on a bichromate bath, the albumen side uppermost. At the end of eight or ten minutes the albumen is coloured yellow, and the sheet is then taken off and hung up to dry in the dark.

An impression may thereafter be taken on this coloured albumen from a negative or a positive transparency, and the image thus formed is applied to the coloured gelatine bath, to which a trace of sulphate of protoxide of iron has been added, and almost immediately the picture is complete, only requiring a wash. Negatives or positives may thus be reproduced perfectly without any loss of half-tones.

Professor Stebbing, so well known in France for his photographic preparations, writes to point out a method by which spotty negatives—negatives, that is, which from long use have got contaminated with the silver in the printing paper, and become more or less covered with brown spots—may be cleaned. It is only necessary, he says, to plunge the negative in a flat tray containing ammonia diluted to half its strength, and, where the spots are, to rub the surface lightly with a cotton-wool pad until they disappear, which they will certainly do, when the negative will be as good as ever.

Some correspondence has appeared lately relative to developing-holders, M. de Courten having "figured" one a fortnight ago similar to a little handy instrument described in this Journal last year. Now, M. Ed. Quiquerez shows two plans which may be worth reproducing. The one has merely fixed and sliding hollowed-out slips, between which the plates are gripped during manipulation. It has also a pistol-like handle, which is of doubtful advantage, but may still commend itself to some people. The other has pegs instead of grooves for holding the plates, and the pegs are so placed that the plate may be held lozenge-wise if desired, which will often prove of considerable advantage. Both instruments are very simple, but both, we think, are inferior to the one we described, in that the sliding end has to be fixed with a screw, which is troublesome and takes up time. An elastic band, which pulls up the bar at once and requires only the pressure of the thumb to withdraw it, is far preferable.





It will thus be seen that the second of these holders offers some advantage over the one described by us, in that it has two pegs instead of one on the sliding-bar; and were it handle-shaped somewhat, and elastic bands fitted to it, it would be a very useful instrument.

PHOTOMETRY.

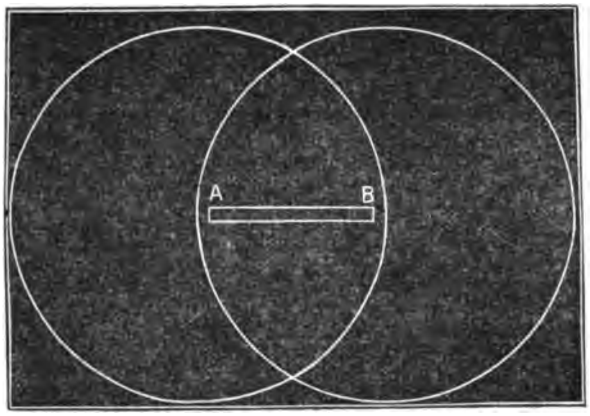
STRIPS HAVING ARITHMETICAL GRADATION.

ANYONE interested in quantitative photography will at once see the advantage of being able to express in figures the value of different grades of colour obtained by the unequal exposure of the material upon which the light acts. Further: it is at once evident that a series of tints, having gradation from the darkest to the lightest tint in an equal manner, so that by applying a rule having equal divisions as its scale, you at once obtain the value of any portion; for, as your gradation is in an equally increasing or decreasing scale (as the case may be), one part is not more sensitive than another, and for purposes of comparison must be more useful. That a pendulum strip has unequal gradation another writer has mentioned; and I do not remember any form of instrument for the purpose of obtaining graduated strips yet published that is not open to this objection, with the exception of that given in the present volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, page 50.

It is now proposed to give another instrument, whereby strips in any gradation may be easily obtained.

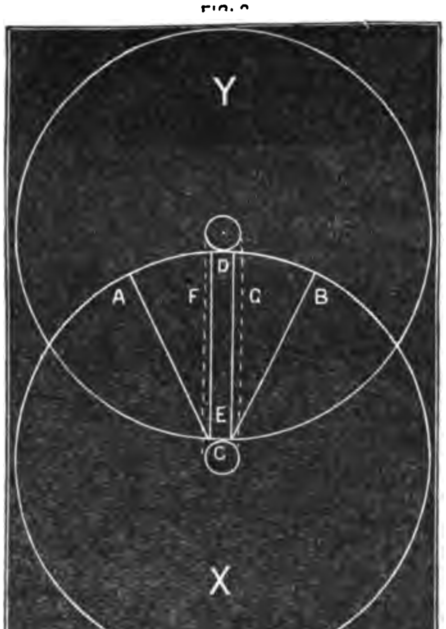
When a circular disc is revolving on its centre the speed of any portion compared with another depends upon its distance from the point upon which it revolves; and, taking any portion of the radius as your unit of speed, the speed of any other portion may be compared therewith, and from thence, if there be an aperture in the disc reaching from the centre to the circumference, the amount of light falling upon any portion of the surface under the disc may be ascertained, being proportionate to their respective distances from the centre. Now, if we have two discs equal in every respect, and revolving on centres the distance of one of the radii apart, letting the discs pass over each other (see *fig.* 1), and when at rest cut an aperture, A B,

FIG. 1.



through both; if a piece of sensitive paper be placed under A B, and the disc set in motion, the exposure received on that paper will be equal from end to end, because the slowest and quickest portions of each aperture are opposed to and neutralise each other. Further: the aperture on the undermost disc may be dispensed with, and the sensitive paper put in its place, with the same result. It is now evident that any variation in the aperture must occasion the same amount of variation in the gradation. If the variation of the aperture be in an arithmetical progression the gradation will be the same, and so on. *Fig.* 2 will help to explain:—A B C aperture in

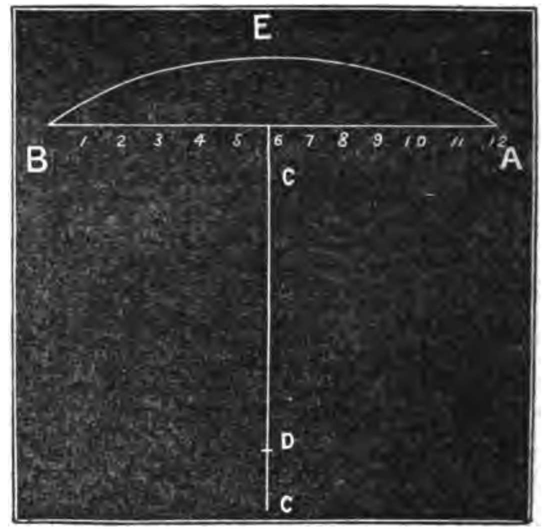
FIG. 2



disc X; D E strip on disc Y; F G band under discs, by which motion is conveyed from one to the other. There may be more strips and apertures on the same disc if it be desired.

It has been shown [*ante* page 51] that a single disc with a rectangular aperture does not give a strip graduated as desired, but that a segment of a circle in place of a rectangle was required. For any who would wish to construct such a curve the means of so doing is here given:—First, determine what breadth of aperture you require to give, say, exposure ten, and let this be your unit of measurement. Say it is an inch; then draw from the centre of revolution B (fig. 3) a radial line of twelve inches at 5·8 from centre; erect a perpendicular, C C; then, with your compasses separated a space of 10·5 inches, and with one leg on B, cut the perpendicular in D, and with this as a centre describe the curve B E A. Cut out the inscribed space, and you have the aperture desired. At distance 2 you have exposed ten; at 3, nine; at 4, eight, &c.

FIG. 3.



At some future time a method of using a scale of tints with a vernier of tints, so as to obtain extreme accuracy, will be discussed.

W. E. Batho.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 31	Liverpool Amateur............	Free Library, William Brown-st.
April 1	Edinburgh.....................	The Hall, 5, St. Andrew-square.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fourth "popular meeting" was held in Queen-street Hall on the evening of Wednesday, the 18th inst.

The exhibition consisted of a series of pictures of American scenery, including some fine views in the Yosemite Valley, and several very clever instantaneous pictures of horses, cattle, and dogs.

Mr. W. H. Davies, who gave the descriptive lecture, began by saying that the first part of the exhibition, including the exceedingly beautiful instantaneous pictures, had been presented to the Society by the Photographic Society of Philadelphia through its Secretary, Mr. Ellerslie Wallace, who, some of the members would remember, honoured them with a visit some time since. The pictures, as would be perceived, were of a very high class, and he had no doubt the members would see that they required to "put their best foot foremost" if they wished to keep abreast of their American cousins. Most of the Yosemite Valley and Niagara pictures had been kindly lent for exhibition by Mr. Walter B. Woodbury, and, as they were printed by the process which bears his name, it would be seen that it was capable of giving very high-class transparencies.

The hall, as usual, was quite full, and the exhibition was in every respect a success, especially the portion relating to the wonderful Yosemite Valley, about which the lecturer gave much interesting information, for which he received a hearty vote of thanks.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The meeting of this Association advertised to be held at the House of the Society of Arts on Thursday-evening, the 19th inst., was, on account of the paucity of the attendance, adjourned *sine die.*

After the adjournment of the general meeting the Committee proceeded, according to the rules, to fill up the vacant offices, when the following gentlemen were elected:—*Vice-Presidents:* The Rev. F. F. Statham, M.A., and Mr. J. H. Dallmeyer, F.R.A.S.—*Trustees:* Colonel Stuart Wortley, Captain Abney, R.E., and Mr. W. England.—*Auditors:* Mr. A. L. Henderson and Mr. G. Taylor.—*Chairman:* Mr. George Croughton.—*Deputy-Chairman:* Mr. E. Ganly.—*Board of Management:* R. J. Mann, M.D., F.R.A.S., Messrs. W. S. Bird, J. Skinner, Thos. Fall, W. T. Bovey, W. Ashman, C. Sergensen, Corles, A. Wilson, P. Buchillot, Rheinlander, and Amand.

Mr. Wilkinson requests us to acknowledge the receipt of the following sums in aid of the funds of the Association:—Messrs. Mawson and Swan, £5; Messrs. Spencer, Sawyer, Bird and Co., £5 5s.; Mr. F. York, £5; Mr. J. Skinner, £3; Mr. David Rees, £1 1s.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A MEETING of this Society was held on the 6th March last. The chair was occupied by M. Balard, of the Institute, the President, who, after the usual preliminary proceedings, read a letter from M. L. Joliot enclosing three lunar prints by Mr. Rutherfurd, and which were sent by him from America for presentation. They were much admired.

The Secretary then went through the correspondence, and read first a letter from M. Clement Sans, of Saurat, giving a formula for a new encaustic for paper prints. M. Sans referred to an old form of paste published in the *Bulletin* by M. Grüne, and composed of Marseilles soap and white wax. This paste spread with great freedom over the surface, was very workable, and gave a fine polish; but it had the inconvenience, if care were not taken, of scratching the albumen, and it had, besides, a very pronounced smell, which, in the long run, became insupportable. He had, therefore, modified the encaustic, making it free from any tendency to scratch the surface of the picture, while it was both more brilliant and of a pleasant smell. It was made thus:—

Pulverised gum arabic..........................	2 parts.
,, sugar candy	5 ,,
Transparent soap, *à la glycerine*, well grated	10 ,,

Water, *quant. suff.* to moisten the soap and dissolve the whole.

Add subsequently ten parts of grated white wax, and boil the whole over a sand bath, stirring continually, in an earthen jar or coffee-pot capable of holding five times the quantity of the mixture. When boiled, empty into a jar, and when cold the mixture should have the consistence of a good pomade.

Mdlle. Rosine Mezzara wrote regarding the spotting of positive prints, to the effect that she had been grievously troubled therewith, and, after suffering much annoyance, had arrived at the conclusion that the spots were caused by the ashes of tobacco falling into the water used for washing the prints. So soon as that was suspected smoking in the workrooms was prohibited, and since then not a single print had been lost.

M. LACAN here stated that M. Claudet had long ago pointed out the evil effects of tobacco, whether smoked or as snuff, on photographic prints.

M. MARTIN said that the fumes of tobacco smoke were not without influence on the plates before and during their development—a fact, which, in the opinion of

M. PELIGOT (of the Institute) was not at all surprising, considering the nature of the products of the combustion of tobacco.

M. Perrot de Chameux then passed in review the foreign journals of the month, noticing, amongst other things, the modification in the terms of the Crawshay competition, and entering into a full explanation of the nature of gelatine emulsions, giving, in particular, a very clear description of Mr. Kennett's plan for preserving the prepared gelatine by drying it. He hoped that Mr. Kennett's idea would help to spread in France some knowledge of a process hitherto almost unknown there, and one which it was at least permissible to hope might prove less deceptive than collodio bromide. It would, at least, have the advantage of permitting the preparation of a large quantity of the emulsion gelatine at a time—a thing not to be despised; for it appeared that, owing to the viscous nature of the glue, bromide of silver formed in it much more slowly than in collodion.

M. Perrot then gave a description of the new process of *heliogravure*, recently referred to in this Journal. After some further reference to notes in our pages and in American journals and to other matters not necessary to repeat, the Secretary concluded, and then

M. Fleury-Hermagis, the optician, brought forward some new extra-rapid objectives—flint lenses, with minium (red lead) base chemically pure. With one of these lenses of a diameter of only eighty-one millimetres *carte*-sized pictures could be obtained. Groups of children and animals might be taken with them in an exposure of two or three seconds at most; and this perfection shows, he states, that France has nothing to fear from foreign photographic lenses. Beside these he exhibited a new aplanatic lens for groups. Its diameter is fifty-three millimetres, and it will cover a plate 18 × 24, as the proofs exhibited showed. M. Hermagis also handed round some fine prints of large dimensions by M. Carlos Relvas, of Portugal, and obtained with the globe lens furnished by his (M. Hermagis') house.

M. Ferrier laid before the Society a number of remarkable prints of microscopic objects intended to be exhibited at scientific conferences by means of the megascope, and pointed out how this system had had its origin in France in the magnificent conferences at the Sarbonne. Although other nations had since taken the matter up, these prints were a proof that France was not lagging behind.

M. Pellet showed the working of an instrument which enabled one to register a fraction of a second, and which might be employed with advantage by photographers and opticians in ascertaining the comparative rapidity of lenses when trying them against each other.

This closed the business, and the Society adjourned till the second Friday in April.

BERLIN PHOTOGRAPHIC SOCIETY.

AT the first meeting in January last Dr. Vogel, the President, occupied the chair.

The Secretary laid before the meeting a picture taken from a negative not made by photography, but painted. It was sent by Professor Menzel, and was made about eight years ago by painting on a varnished plate with india-ink. The picture, notwithstanding its rigid technical character, was worthy of being looked at.

Herr Moser showed some singular stereoscopic pictures taken looking towards the sun with a large stop. There were two reflex images of the sun on the plate, the one above the other and larger than the other, while the sun itself was not in the field at all.

The CHAIRMAN said that it was doubtless due to reflected images of the sun on the surface of the lenses which appeared on the plate when a large stop was employed.

A provincial member sent for criticism the plan of a new studio. The size of the room was thirty-two feet long by twenty broad, the height of the side nine feet, and of the centre thirteen and a-half feet. It stood on the ground and had a pure north light, but the background end and also both sides were surrounded by high buildings.

Herr REICHARD recommended (as did also the Chairman) that the studio should not be so broad, but longer; for the removal of the background to a greater distance prevented false reflections, and thirty feet was hardly long enough for groups. He cited the example of a studio which was thirty-five feet long by seventeen broad as a good model by which to build.

Herr HARTMANN and others held that the high side walls of the east and west ends were decidedly bad, because through them the high front light was lost, and thus the shadows rendered darker and the exposure longer. The high buildings on the south side were an advantage, for they kept away the sun's rays for the most part.

The Chairman demonstrated the method by which he tested cardboard mounts for the presence of hyposulphite of soda.

Herr RENHARD asked if it were not possible to get rid of the danger altogether.

The CHAIRMAN said that the soda was used for the purpose of removing the chloride with which the rags were bleached in making paper, and that, therefore, paper which was made out of pure white rags would be entirely free from it. It was possible, indeed, to employ a sulpho-nitrate instead of the ordinary hyposulphite, and which was very stable and not likely to injure the prints, but it was too costly for ordinary use. The hyposulphite, however, could always be removed from the cards by washing them in iodine water.

Herr MOSER asked if coloured mounts were dangerous in the same way.

The CHAIRMAN said they were. He had found hyposulphite in those also, and he likewise discovered that certain blue and green-tinted cards contained ultramarine—a sulphur containing colour which destroyed the prints very rapidly.

This closed the business of the meeting, which was then adjourned.

AT the second meeting of the same Society, in January, Dr. Vogel again occupied the chair, and communicated to the meeting the fact of the formation of a new society in Hamburg under the presidency of Herr Wolff.

A Paris theatrical paper, called the *Paris Théatre*, was then laid on the table. It contained illustrations of prominent actors and actresses, printed by the Woodbury process and mounted on the front page. They were done cabinet size, and the price of the paper with pictures complete was only twenty-five centimes, or about 2½d. in English money. The printing was done by MM. Goupil, and the negatives were taken by various Paris photographers.

Baron von Granges presented a number of views of the Campezzothale in the Tyrol and of Sicily.

The CHAIRMAN commented on them in terms of high praise, especially as to the views of Sicily.

Dr. ZENKER spoke of the interesting essay recently published by Dr. Draper, of New York, and which contained a lichtdruck of the solar spectrum from the blue rays far into the ultra-violet. The photograph covered the visible spectrum only as far as the line G; but Dr. Draper stated that he had since been able to get a photograph extending as far as the ultra-red rays, although he did not say how.

Dr. VOGEL said that Becquerel had photographed the ultra-red rays with chloride of silver plates twenty years ago.

Herr SCHAARWACHTER exhibited some pictures, taken in the dull days of December with some new lens, which possessed extraordinary sharpness and clearness. The lens he declared to be very cheap.

Herr Talbot produced a novelty in Germany in the shape of one of Bigelow's American toned backgrounds. The backgrounds were not shaded, as we have been used to have them in this country, horizontally, but vertically; and, being usable on both sides, they had simply to be reversed in order to alter to taste the effect wanted.

Either the dark side or the light may thus be brought into contrast with the shady side of the face of the sitter.

Herr SCHAARWACHTER said he had tried a background of the kind, but found the shading much too abrupt.

Herr PRÜMM confirmed that statement, and gave the preference over Bigelow's backgrounds to the shell-shaped German ones of Kurtz, only it was impossible with the latter to reduce the shadows. Bigelow's backgrounds, however, appeared to him useless for half-lengths, and, indeed, for busts.

Herr LOESCHER thought that the shading off of the background from light to dark was not near enough to the headline to be effectual.

Herr O. LINDNER believed that an eight-cornered background described by him some time ago, and which could be set up on any one of its corners so as to give a different effect with each, being painted in a fashion similar to that of Bigelow, was much to be preferred.

Herr TALBOT, amid much applause, exhibited in the lantern a series of excellent transparencies printed by the Woodbury process. Their superiority to the ordinary positives was generally acknowledged.

A committee was then appointed to manage a *conversazione*, after which the meeting was adjourned.

Correspondence.

THE PHOTOGRAPHIC SOCIETY OF FRANCE AND ITS DUTIES.—THE BROMIDE PROCESS IN CANADA.—ENLARGING FROM A DIRECT BROMIDE POSITIVE.—THE SOLAR CAMERA OF DR. MONCKHOVEN.

IN a letter just received from M. Lacan he tells me that a good deal of dissatisfaction prevails amongst photographers in France respecting that rule of their Society which precludes it most rigorously from occupying itself with any of those questions which relate to the industrial applications of photography in their commercial aspect. The Society only occupies itself with scientific questions and with improvements in processes and appliances, without at all entering into any question relating to the commercial application of these things. It does not, for instance, undertake to examine the validity of patents, or to aid in the discussion of any industrial or commercial question whatever. All this is with a large party of French photographers a matter of regret. But there are two sides to the question, and it is difficult to see how a society could undertake such duties as are proposed for it without resolving itself into an unlimited company with a commercial object in view—a rather dangerous society to belong to.

On thinking this matter over it appears to me that if a photographic society were to conduct its affairs on ready-money principles, so as never to overrun the constable and always be on the safe side of the hedge, it might venture to mix itself up commercially with photography just so far as this, viz., to have a college in connection with itself, where the different branches of the art might be taught by competent professors, and where a diploma of proficiency might be granted to pupils who pass a satisfactory examination; and also to hold an exhibition of pictures and apparatus, which should be open all the year round, admission free, and where exhibitors should pay for wall space, tables, screens, &c. In this exhibition works might be offered for sale, the society charging a certain commission, and keeping a clerk always in attendance to look after that department. This would not interfere with the interests of the trade and profession, but would rather be an aid to them than otherwise, whilst the pictures exhibited would be a standing advertisement of the different portrait establishments, enlargers, retouchers, opticians, apparatus makers, &c. On the other hand, it would be fatal to a society to enter into direct antagonism with the trade by selling its own chemicals, apparatus, &c. A commercial company merely working for a dividend to shareholders is one thing; but a society established for a scientific purpose and for the advance of an art, irrespective of pecuniary gain to members, is another thing altogether, and the two ideas should not be confounded in any way.

I have just received a letter from an amateur photographer in America—Mr. W. H. Metcalf, of Milwaukee, Wisconsin—accompanied by a present of a charming collection of prints from negatives of American scenery, by the common wet process. In this letter he makes the following remarks respecting the bromide process with the bath, which, with a few comments of my own, will, I hope, interest my readers.

"Now as to the bromide dry and moist processes. Since the first intimation which you threw out in THE BRITISH JOURNAL OF PHOTOGRAPHY of the albumen preservative, &c., I have been constantly experimenting, beginning with six and a-half grains cadmium bromide and a bath sixty-five grains strong, and increasing gradually up to twelve grains cadmium bromide and an eighty-grain bath. I have not, however, had that success which I desire, nor obtained the uniform quality of negative which I believe the process to be capable of. I have exposed plates wet, dry, with and without glycerine, from three minutes to ten in the bath. They are exquisitively sensitive—in that respect *far ahead of anything I know of*—and full of detail. But in my hands they lack crispness and brightness; the deepest shadows are never clear glass. I am particular to the last degree about the lighting of the dark room. The alkaline developer, either weak or strong, fails to satisfy my expectation. Redevelopment with silver will sometimes improve the negative. I have now made a clean breast of it, and would really be glad to be put in possession of such information as will enable me, *cæteris paribus*, to produce such work as we read about. *The rapidity and amount of detail in these plates delight me*, and if I could make them equal in other respects to the Liverpool dry plates, and others which I prepare equally good, I would take them with me to Colorado," &c.

My correspondent—assuming, of course, that his dark room *is* really dark enough—probably errs from one or all of the following three causes, viz., impure water for washing his plates; insufficiency of restraining soluble bromide in his developer in proportion to the ammonia; and an improper and too hasty mode of development. He must be kind enough to refer to what I have recently written on this subject, and I would advise him, and all others in a similar predicament, to develope an *un*exposed plate, and try and keep that clean and bright, as a first lesson.

With respect to the want of crispness of which he complains, that, I have sometimes thought, is really a weak point of the process, and may proceed not only from blurring, but from a sort of lateral transmission of actinism within the film, if I may use the expression. The fault is corrected at once by the addition of a little aurine to the collodion, so as to stain the film yellow; but this occasions a diminution of sensitiveness. My correspondent had better, perhaps, reduce greatly his times of exposure; for the films, I suspect, are more sensitive than even he has any idea of.

The bromide process with the bath ought, I think, to be reserved exclusively for portraits and instantaneous views, and never be used for common subjects, for that would be like putting a racehorse into a coal waggon. Bromo-iodised collodion, with a bath of the usual strength, answers better for ordinary views, and really leaves nothing to desire in point of result. Here the iodide of silver seems merely to play the part of aurine, when all free nitrate is washed out of the film.

M. Mévius, of Rennes, has just sent me a print from an enlarged negative, which I enclose herewith to our Editors to see, as it establishes a fact but little known or appreciated amongst photographers, viz., that a positive taken direct in the camera by the bromide process and the nitric acid treatment is sufficiently dense to yield a vigorous negative in the copying camera. A positive taken in this way direct, being composed of different thicknesses of bromide of silver, is, at first, yellow, but it turns blue by exposure to light, and is even then dense enough to yield a strong negative. The print sent has been enlarged in a Monckhoven solar camera from a plate three inches square up to one nine inches square, the subject being a kiosk in my garden, which I took whilst M. Mévius was last on a visit to me with an exposure of five seconds; whilst a good wet collodion plate developed with iron required a minute under the same circumstances exactly, proving the bromide plate to be twelve times quicker than the other. Although all the tones and gradations have been rendered with the same force of contrast and perfection as if the enlarged negative had been taken direct in the camera, yet there is a loss of sharpness, which proves that that particular mode of enlarging is very imperfect, and not to be compared with a copying camera with a sky background and a doublet lens stopped down. In the solar camera the sun's image upon the copying lens travels about over its whole area, so that it amounts to the same thing as copying with the full aperture of the lens, instead of with the lens stopped down. The copying lens of a solar camera should be used with a stop no bigger than the sun's image, and the instrument should be mounted equatorially and pointed to the sun, instead of being used with a reflector.

Redon, March 20, 1874. THOMAS SUTTON, B.A.

P.S.—I have just read with much gratification Mr. Buxton's letter at page 122, and am glad that so distinguished an amateur approves of my moist process.—T. S.

THE COLLODIO-BROMIDE PROCESS.

To the EDITORS.

GENTLEMEN,—I believe that the following would prove a good and economical method of making an emulsion which would not require washing. I have come to the conclusion that pyroxyline, more especially if not of a powdery, dense kind, should be acted upon by nitrate of silver in order to obtain density.

To this end I make a solution of pyroxyline in methylated ether and alcohol, dissolving four times as much pyroxyline to the ounce of solvents as it is intended the finished emulsion shall contain, and, having previously dissolved from a quarter of a grain to half a grain of nitrate of silver (according to the nature and quantity of the pyroxyline) per ounce of finished emulsion (a powdery pyroxyline would probably bear more nitrate of silver than one giving a horny, structureless film), I lay this stock collodion by for a week or more in the dark, and before using some of it for the first time test it for free nitrate.

Perhaps this may be best done by pouring a few drops of the collodion into a clean glass or test tube, making the collodion flow round the sides, near to the bottom of the glass, and, after letting it set, pouring in some alkaline developer, omitting the restraining bromide. If, after allowing the alkaline solution to remain for some minutes in contact with the collodion, then pouring it off, and rinsing the test glass with water, the collodion be still perfectly colourless, there is no free nitrate. This, I think, is a more reliable plan for testing for a mere trace of silver nitrate than the usual soluble bromide method.

If free silver be detected add more cotton and solvents in proportion, shake well, and set aside for two or three days, when it may be again tested. When the collodion is in a satisfactory condition one may think about making an emulsion.

Suppose I want four ounces of emulsion: I take fifteen grains of nitrate of silver for every ounce of emulsion, and dissolve them in distilled water; then nine grains of bromide of ammonium for every fifteen grains of silver nitrate (the proper equivalent for the nitrate is 8¼ grains bromide, so that there will be an excess of bromide), and dissolve also in distilled water. I then add the silver solution to the bromide solution and stir with a glass rod. I now wash the precipitate in the usual way, and rinse it with methylated spirits; after which it is placed in a mortar and ground with a pestle, as described lately by Mr. J. W. Gough in the case of gelatine emulsion, adding one ounce of the collodion to it by degrees, pouring it out of a graduated bottle.

It will be as well to grind any organic substances with the bromide of silver before adding the collodion; in this way any water the same may contain will be drawn off in drying, which may now be proceeded with by pouring the emulsion into a glass dish or glass plate edged with paper, and placing it in a moderately hot oven. When dry dissolve in four ounces of absolute solvents.—I am, yours, &c.,

Cotheridge Court, near Worcester, HERBERT B. BERKELEY.
March 24, 1874.

SECRET PROCESS-MONGERS.

To the EDITORS.

GENTLEMEN,—Mr. Sutton, in cautioning your readers against secret process-mongers in your issue of the 13th inst., remarks that if a process be really new it can be safely patented. Many of your readers will differ from him in this particular. If the process be one which in its final result leaves no evidence of the novelty in the means by which it is obtained it simply comes to this—that you cannot detect infringements of your patent, in consequence of which everybody will use it and nobody pay for it.

I have just completed a process of this kind myself. The object is eminently desirable. The process accomplishes the object. But the result shows no trace of the means employed. To patent it would be merely a waste of money. To give it would leave laborious and, I think I may say, well-directed labour unrenumerated. To keep it to myself is to restrict its usefulness to a thousandth part; and to offer it for sale is to place myself in the category of those whom my friend, the Chevalier Lafosse, calls "tricksters," and against whom Mr. Sutton warns your readers to be on their guard.

I am, I think, of a reasonably obliging disposition, and ready to take the proper course when it is shown to me. Professor Huxley has recently remarked that it is better for a man's worldly prospects to be a drunkard than an original investigator. As investigation happens to be the only kind of labour for which I am adapted what shall I do if I may not receive a recompense for the results to which it leads?

"You take away my life
When you take away the means whereby I live."

—I am, yours, &c., D. WINSTANLEY.
Blackpool, March 23, 1874.

SELF-DEVELOPMENT OF MOIST PLATES.

To the EDITORS.

GENTLEMEN,—I have lately been experimenting with Mr. Sutton's moist process, and this morning the idea occurred to me that the plates might be made self-developing by the addition of pyrogallic acid to the preservative.

I prepared a plate with a preservative composed as follows:—Albumen, one part; glycerine, one part; six-grain solution of pyrogallic acid, two parts. Exposed for forty seconds with a single view lens (a wet plate would have required from ten to fifteen seconds). On being removed from the dark slide, seven hours afterwards, it was found to be fully exposed and developed, and nothing left to do but to intensify.

I am not aware whether or not this "dodge" has been tried before, but it would be a very clean way of working.—I am, yours, &c.,

2, *Melville Hospital Terrace, Chatham,* W. S. H.
March 25, 1874.

SECRET PROCESS-MONGERS IN AMERICA: QUEER REVELATIONS.—Mr. W. T. Watson, of Hull, has written to us regarding our paragraph last week expressive of our wonder at the singular attitude of Messrs. Robinson and Cherrill as process-mongers in America. From Mr. Watson's letter and from the correspondence, confirmatory of its statements, that has passed between him and those gentlemen, and which he has forwarded to us, we gather that, as we had indeed suspected, the process they are offering is essentially the one sold by him to them for two guineas. We are sorry we cannot find space to publish the correspondence entire, but we have not the least doubt that should Mr. Watson require to defend in any way the patent which we believe he has just completed in America, he could not do it more effectually than by publishing the correspondence himself in pamphlet form and offering it to his brethren for their enlightenment. Meanwhile, the following sample may serve to prove the quality of the whole. It appears that Messrs. Robinson and Cherrill, in their earlier efforts to profit by this invention, had entrusted it to a shrewd American, who, with a view to make the most of the business pecuniarily, proceeded to take out a patent. The American patent law requires, however, that the original inventor shall, before a notary, swear to his having invented or discovered the process to be patented; but as the American gentleman referred to was clearly neither the inventor nor the discoverer of the process about to be sold to him by Messrs. Robinson and Cherrill, he naturally assumed that *they* were the inventors, and he therefore, as such, sent them the necessary documents to complete. These gentlemen now found themselves in a difficulty, for, although they were willing to sell the process as their own, they were unwilling to swear that it was so; they, therefore, were obliged to have recourse to the real inventor, Mr. Watson. This will explain the following extract from a letter, dated June 30, 1873, sent by Messrs. Robinson and Cherrill to Mr. Watson. They say:—"The party to whom we have been anxious to sell is an American; and, as you know, Americans are keen men of business, so our friend has gone about to secure the game to himself by taking out a patent for the process in America. This patent, he finds, he cannot execute himself, as the patent law of the United States requires the documents to be signed and sworn before a notary by the inventor or inventors of the process. He has, therefore, sent the document over to us for signature. Now, we feel that, though we were perfectly justified in selling our knowledge of the art, we are not justified in swearing that we were the sole inventors of the process, especially"—and here is the plum—"especially as the patent agent in the States has, in drawing out his specification, reduced our elaborate instructions to such a very elementary form *as to leave in really nothing but your principles very much as you gave them in your two-guinea circular.*" Further on they speak of the "keen man of business" in America "levying black mail on the process to the extent of one-half the gross receipts" as a reason for their offering Mr. Watson so little. Altogether it is as pretty a piece of business as we ever remember to have come under our notice; but we cannot prolong our extracts.

TO THE PROFESSION.—That it is a branch of the fine arts is the honourable boast of those of our number who have a love for their work, and ambition above the sordid consideration of dollars and cents; but there are by far too many of us who have no just conception of or care for the higher claims of art, and tinker along a daily routine of careless, botchy work, merely regarding it as a trade by which they can subsist with less labour than by following heavier trades, for which they might be better adapted. No wonder, then, with so many of these evidences of perverted skill (?) constantly before them, that the public misjudge the merits of our beautiful art, and degrade it to the level claimed by this miserable mediocrity. It may be urged by some that this objection is a very fanciful one; that it matters little what is thought of us by the public so long as they come to us as sitters and pay their money. Individuals advancing such an opinion take to themselves credit for a great deal of philosophy that they are able to take such high and independent ground. But, in reality, is it not rather grovelling than noble? and is it not our duty to strive to gain the good opinion of the world in an honest and manly way? We should treat all our visitors in a uniformly courteous manner, not toadying to the rich and influential, and snubbing the poorer of our customers; adopting politeness and uniform attention to all, not as a policy that pays but as a duty to ourself as a gentleman. That you will reap a benefit from it there is no doubt, and in addition to this pecuniary advantage you raise the tone of your business, and tend to an advancement of the profession. Not one of the less active of the causes of the low estimate the public take of photography as a profession is to be found in the constant parading of vulgar jealousies—that *public washing of dirty linen*, alas! too common amongst us. Let us never fail to speak with the greatest possible respect of our competitors and their work. Instead of petty sneers and insinuations of ugly things, which are mean and contemptible, let us speak of our rivals as we would they should speak of us. Our listeners can discriminate between the utterances of jealousy and the expression of fair and honest criticism; and the calumniator, believe me, does not benefit himself, but only brings discredit on the profession. A little more politeness and charity and a little less jealousy would tend greatly to our advancement in the respect of the public. The time has come when our profession depends on the highest order of culture, thought, and art knowledge; for our customers are becoming more and more enlightened in art matters every day, and bring fine discriminating powers to bear in their judgment of our work. It is necessary for us to be ahead of them, or we shall find ourselves deserted by all our friends; while we shall see Mr. Jones, across the way, who does keep up with the times, who does think and act on his artistic knowledge, and is of gentlemanly deportment, has his gallery filled with satisfied patrons. Read the journals devoted to photography. You may not be able to see how much you gain by it; you may even doubt if you have gained a single "wrinkle," and perhaps you may believe you know more than the editor and all his staff put together. But, even in this unpleasant state of mind, *read*. *Read* all this "trash and nonsense." It tends to elevate the mind, and in that way, if in no other, it does you good. —W. Heighway, in *Phil. Phot.*

EXCHANGE COLUMN.

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

The wheels and shafts of a dark box, in exchange for a quarter-plate lens and camera.—Address, A. Clarke, High-street, Stourbridge.

I will exchange from a dozen to a hundred first-class stereo. slides of Highland scenery for an equal number of other subjects, mounted or unmounted.—Address, D. Johnston, Photo., Forres, Morayshire, N.B.

Wanted to exchange, a first-rate race, marine, and opera glass, 1¾ object-glasses, with case equal to new, for pair of good stereo. lenses, good 1-1 plate portrait lens, or view lens for 12 × 10.—Address, J. H. Turner, 97, Manchester-road, Swinton, near Manchester.

ANSWERS TO CORRESPONDENTS.

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

Heliochromy.—Among several articles in type, and which have been crowded out this week, is the second portion of the article on *Heliochromy*.

Alex. Henderson (Montreal).—Remittance received, with thanks. The postage of the Almanac was 9d. each copy.

J. S. Morton.—To etch the glass procure a leaden or gutta-percha tray, and place in it some powdered fluor spar. Now add a little sulphuric acid, by which fluoric acid will be disengaged. By holding your glass plate above the tray it will be rapidly etched.

"No. 90."—This correspondent begs to give his mite of testimony to the value of the preliminary coating as given in the Almanac by Mr. J. G. Tunny, and inquires if this coating will answer for Mr. Sutton's moist bromide process. We have no doubt whatever that it will do so.—2. There is no alteration recommended.

Geo. Munroe.—Judging from the sample we have received your acetic acid is not glacial, nor is it anything near the strength of it. It is certainly no stronger than a mixture of equal parts of glacial acetic acid and water. This is quite sufficient to account for your failure when trying a process in which a proper proportion of this acid is indispensable.

W. S. H.—1. The pamphlet may be obtained at the Publishing Office of this Journal, price one shilling.—2. Procure ordinary plain collodion and dissolve in it the requisite proportion of bromide. It will keep good for several years. We occasionally use some that we made in 1866, and find it still retains all the good properties it possessed when freshly prepared.

Cadmus.—1. We quite approve of the method of development you have adopted. You might, however, try the alkaline developer given on page 178 of our Almanac for the present year. Its adoption would enable you to reduce the time of exposure in the camera.—2. As we have never known of the existence of flare in the lens mentioned we conclude that it may possibly not be genuine.

J. S. Hailes.—M. Silvy *was* more than two years in Bayswater. He was a very efficient photographer, and his manner and style were somewhat original. Further—and what is of paramount importance—he was a thoroughly good business man, and knew better than most of his contemporaries how to turn these talents to account; hence his undoubted commercial success. With respect to the absence of top light, a light of that kind is not required *provided the side light be sufficiently high;* the latter then becomes, practically, equal to the former. From our recollection of it we think that M. Silvy's studio possessed a small *high* front light. After all, much more depends upon the man than upon either the construction of the studio, the camera and lens, or the process employed.

D. G. Wardour.—Formic acid and phosphoric acid are entirely different preparations. The former is a colourless liquid; when strong it fumes slightly in the air, and its vapour is inflammable, burning with a blue flame. Avoid letting any of it get upon your skin, on account of its corrosive action upon living organic substances. This acid reduces the salts of silver and mercury. It has been frequently recommended for addition to the developer; but we believe that it is very little used. We have never found it to possess any of the special advantages claimed on its behalf.

F. B.—1. The portrait enclosed is not a Rembrandt, but is in the style introduced some time ago by Bergamasco. To produce this class of picture, use a very dark background and print in the usual way; then, having removed the negative, shield the head and bust by a vignetting mask of the opposite kind to that usually employed, and again expose to the light until the margin has become black.—2. Any good collodion will answer for the moist process, provided it contain a large proportion of bromide.—3. The stains on the glass plates will not affect the negative if you employ a substratum of diluted albumen in the proportion of the white of one egg to a pint of water.—4. The tone of the *carte* view is *excellent*. Do not change your toning bath. The following is also good:—Dissolve one grain of chloride of gold and thirty grains of acetate of soda in eight ounces of water, and do not use it for at least one day after preparation.

Rev. F. B. (Southgate).—In the construction of a registering barometer, such as you desire, we do not counsel the use of photography at all. The method you suggest is certainly quite practicable, but it would be attended with several difficulties of a somewhat serious nature. A much better way will be to discard entirely the use of the mercurial barometer, and adopt a large aneroid in its stead. On the central axis which carries the hand place a light wheel about two inches in diameter, and let this be "geared" in a long rack, by which the circular motion will be converted into rectilinear. The rack must carry a finely-pointed lead pencil, which travels over the revolving and graduated slips of paper connected with the clock. In this way you will, by merely changing the paper once a week when winding up the clock, be able to secure continuous registration without any trouble. Every care must be taken to secure lightness in the various acting parts, so as to have the friction reduced to a minimum.

Received.—M. Carey Lea; T. Sutton; "A. J. W." In our next.

Werge's Iron Developer.—We have received from Mr. J. Werge, 11a, Berners-street, Oxford-street, a sample of an iron developer he prepares *pro bono publico*, and for which he claims special advantages. In subjecting it to a comparative trial with a plain iron developer we found that Mr. Werge's had decidedly the advantage, inasmuch as it allowed the development to proceed slowly up to the pitch of full printing vigour without the shadows being in the least degree impaired by fogging. This capability of yielding a clean picture under a long development is of great value.

GOOD FRIDAY.

Our next usual day of publication falling on Good Friday, this Journal will be published on THURSDAY next, the 2nd of April. Orders from Advertisers and Agents should reach our Office not later than Tuesday Evening next.

Publishing Office—2, York Street, Covent Garden, W.C.
March 27, 1874.

LONDON GAZETTE, *March* 24, 1874.

Partnership Dissolved.

G. and T. Millichap, Liverpool, photographic artists.

METEOROLOGICAL REPORT,

For the Week ending March 25, 1874.

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

These Observations are Taken at 8.30 a.m.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
19	30·14	WNW	40	43	53	38	Fine
20	30·0	NW	40	44	51	40	Fine
21	30·18	SSE	41	46	55	41	Dull
23	30·30	W	49	51	65	49	Dull
24	30·35	WNW	44	44	59	43	Dull
25	30·74	NNE	40	42	56	39	Fine

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 726. Vol. XXI.—APRIL 3, 1874.

N:THE ADJUSTMENT OF DISSIMILAR STEREOSCOPIC LENSES.

.. difficulty of finding two portrait lenses so identical in focus as produce pictures which, as respects dimensions, will be *facsimiles* well known. When a number of lenses are made out of the same t of glass, and ground to the same curves, marked differences will en exist in their foci.

Such being the case with lenses of a similar kind coming from one tician, the difficulty of obtaining two lenses alike, which have been ade by different mechanics and of different degrees of curvature, is ry greatly increased. It is, however, not only possible to bring two ssimilar lenses to absolutely the same focus without having to sort to re-grinding and polishing their surfaces, but it is a matter hich is not attended with so much difficulty as to be insurmountable y any reader of intelligence who possesses a moderate amount of echanical skill.

In order that this matter may be thoroughly explained we shall ssume an entire ignorance on the part of the reader of everything nnected with the focus of a combination, except the fact patent to ll that the *back* focus in reality does give a clue to the real focus of he lens. In comparing two lenses it is the size of the image formed y each that is the real criterion by which they are to be judged. here may be two lenses in which the back elements of each are recisely the same distance from the ground glass when both are harply focussed, and yet the size of the respective images on the round glass will be widely different. The reason is obvious: the *uivalent* focus is that by which the size of the image is determined, nd in a portrait lens the point from which the equivalent focus is easured—or the optical centre—has a very wide range of position, eing in some combinations near the front lens and in others nearest to the back.

In combining two plano-convex lenses of similar foci—say of twelve inches each—these, if placed with their flat sides in contact, will yield a combination (although not deserving this appellation) of six inches focus; and it is not possible to make of those two any shorter focus than this. But the equivalent focus may be lengthened to the extent of several inches by the expedient of separating the lenses; for the greater the distance between them—or, in other words, the longer the tube in which they are mounted—the longer will be the equivalent focus.

Bearing this in mind, it becomes a very easy matter to adjust a pair of compound lenses of dissimilar foci so that both shall produce images absolutely alike in respect of size; for if one give a smaller image than the other it proves that the equivalent focus of such lens is shorter than that of the other, and, as by separating the lenses, the equivalent focus is lengthened, a point will be found at which the images given by both lenses will be similar. It ought to be noted here that in proportion as the real focus is lengthened so is the back focus shortened.

In some instances the difference between the size of the images is so little that both lenses may be made to coincide by unscrewing the cell of the back lens a few turns. In a pair of quarter-plate lenses in our possession absolute similarity of image could only be obtained when both front and back lenses of the instrument having the shorter focus had been unscrewed so far as to be in danger of dropping out of the tube. The permanent remedy for this was to have a short supplemental piece of tube which screwed into the principal tube, and into which, in turn, was screwed the cell containing the back lens.

What has been here said of portrait lenses applies to every kind of combination, by whatever name it may be known; and it will be obvious that the foci may be assimilated by shortening the tube of one lens as well as by increasing the length of that of the other.

It may prove useful if we here give directions by which the focus resulting from the combination of any two lenses of known focus may be ascertained. We have already spoken of the focus resulting from the combination of two plano-convex lenses of twelve inches focus when placed in contact, As, however, no lenses are ever used when in such a position, the distance at which they are mounted apart must form an element in the computation of the combined focus. When in contact the foci of both are multiplied and divided by the foci added together, which, in the case of the two twelve-inch lenses, make an equivalent focus of six inches. But when separated the distance of separation must be subtracted from the divisor. Thus—supposing an extreme case—if the length of the tube in which these two lenses are mounted be ten inches, the focus, instead of being six inches as previously, will now be ten inches and (nearly) a-quarter.

If any reader have two lenses of the foci of twenty and twelve inches respectively, and be desirous of knowing what equivalent focus they will form when combined and mounted two inches apart, he will find these two sums *added* together form, *minus* two, the divisor for 240, the sum which results from the *multiplying* together of the foci of the lenses. This gives eight inches as the equivalent focus of the combination.

ON THE PHOTOGRAPHING OF FLUORESCENT SUBSTANCES.

In our last week's number we gave a short *résumé* of the laws (as far as known) which govern fluorescent and phosphorescent substances; and we intend, as concisely as the subject will admit of, to supplement that article by a short account of the photographs taken in the investigation of these phenomena.

Dr. Gladstone's experiments were repeated, but with a slight modification. The experiments were performed with quinine—the alkaloid or organic base found in Peruvian bark. The composition is complicated, and may be represented as follows:—

$$\underset{\text{Quinine.}}{C_{40}\ H_{24}\ N_2\ O_2.}$$

Quinine acts as a well-marked base, and combines with acids to form two series of definite salts, of which we will cite the sulphates as types.

The normal salt is rather an insoluble one, but can be well crystallised in flexible needles; this is vulgarly called the basic salt, but is a true neutral compound. The composition is—

$$2\ (C_{20}\ H_{24}\ N_2\ O_2)\ H_2\ SO_4$$

(Two molecules of quinine, and one of sulphuric acid)

form sulphate of quinine.

The acid sulphate differs from the previous salt in being extremely soluble. At a temperature of 100° C. it dissolves in its own water of crystallisation, and at ordinary temperatures dissolves in eleven parts of water. Its formula consists of—

$$\underbrace{C_{40}\ H_{24}\ N_2\ O_2}_{\text{Quinine.}};\ \underbrace{H_2\ SO_4;\ 15\,H_2\ O}_{\text{Sulphuric acid and 15 molecules of water of crystallisation.}}$$

It is, therefore, evident that there are two classes of salts of quinine, and that the acid salts are remarkably soluble. The latter, with some exceptions, are the compounds which exhibit the phenomenon of fluorescence when in solution.*

Dr. Gladstone's experiment of painting a device upon a card was repeated, but with this precaution—that another device was also formed upon the card with very diluted sulphuric acid, the object being, in this case, to imitate the irregularity of surface and also a slight difference of tone produced by the acid of the salts.

When photographed the results were well marked, but not quite so vividly as was expected. In other words, the surface of the card covered by acid sulphate of quinine (now dry) reflected rays the refrangibility of which were lowered to such an extent that their chemical action was much decreased. The result was a negative which printed a dark device upon a lighter background.

In another experiment the acid sulphate of quinine was placed in a test-tube, and the light was allowed to fall upon this and a similar tube of water placed upon a background. When photographed the two tubes came out almost equally black, except that there was a little more reflected light from the background repassed through the water tube, producing to a certain degree the effects of transparence, which could not be so well perceived in the tube containing the quinine salt. In this experiment a saturated solution was used in which crystals of the acid salt were actually forming at the bottom of the vessel.

One of the phenomena connected with this subject is the diactinic power of different media, or, in other words, the power certain solutions, &c., have of absorbing the chemical rays when light passes through them. Stokes pointed out, years ago, that a solution of sulphate of quinine is remarkably opaque to these rays, and that a double pane of glass containing such a solution between them might be almost used as the window of a dark room. (Practically, however, such an arrangement is not found as efficacious as the yellow glass). But in examining a solution in a glass vessel the colour or light effect is described as being produced by reflection, but in most cases it is light of transmission, due to a great thickness. The light having been reflected at the back or bottom of the vessel has, of course, passed *twice* through the solution.

The next photograph was obtained by photographing the tubes—namely, the one containing water, and the other containing a solution of acid sulphate of quinine—entirely by transmitted light. The two tubes were placed behind a black board arranged with slits, which slits were placed behind the two tubes. As in the previous experiments, there was a certain amount of interference with the light; but more light was absorbed in the quinine solution than by the water.

In these experiments a small body of liquid had been used, and therefore we see at once how, with a great depth of liquid, an effect nearly similar to the opaque ink might be obtained, merely from the absorption of rays, either when photographed by so-called reflected light or by transmitted light; but the interference of the quinine, as regards the chemical rays, is but partial, and the experiments merely carry out the experience gained by the practical photographer in the pane for the dark chamber made and tried in connection with Stokes's observations.

One of the most curious photographs, however, was obtained by placing three bottles precisely similar in every respect upon a table, and photographing them by the ordinary light obtained in the studio. One was filled with ink, another with perfectly clear water, and the third with a bright solution of acid sulphate of quinine. The bottle of ink came out exactly as it would be predicated; in other words, it came out a bottle of ink in the picture. As regards the water, there was no indication any further than a photograph of the glass vessel and a line indicating the surface of the liquid, but in the body of the water there was optical vacuity; that is to say, as there were no particles for the light to infringe upon and be reflected, so there was no photographic effect. But not so with the bottle of quinine solution; here the absorption of the chemical rays was not sufficiently marked to overcome a scattering of the rays, which, although the solution was perfectly bright, produced an effect of light.

Thus it is evident that a fluorescent substance is capable of producing opposite photographic effects, according to the arrangements of the light. The rays given off by the phosphorescent bodies are so feeble that, so far, no marked photographic effect has been observed; but at some future day we may return to this interesting part of the subject.

* Stokes has shown that the acids may be divided into two classes—those which produce fluorescence and those which do not. Hydrochloric acid is a type of the acid that will not produce fluorescence, but actually destroys it; whilst sulphuric acid and the general run of acids which seem to be constructed upon the same type are the generators of fluorescence. Therefore, hydrochlorate of quinine or hydiodate of quinine are not fluorescent salts.

We are much pleased to hear, and we are sure that our pleasure will be shared by the great majority of our readers, that the Lord Chancellor has appointed Colonel Stuart Wortley to the charge of the Museum of Patents at South Kensington, in succession to Sir Francis Pettit Smith, recently deceased. We are extremely glad to find that an office has been offered to and accepted by Colonel Wortley which, while being one of much importance and responsibility, will yet leave him sufficient leisure to pursue those artistic and scientific studies which have made his name distinguished wherever photography has penetrated.

GELATINO-BROMIDE.

As I have already made known my mode of mixing up an emulsion from bromide of silver, I shall now detail some further experience in my endeavour to bring this process into practical working shape. I have already expressed my surprise at the comparative insensitiveness of the films obtained in the manner in which I had prepared them from bromide of silver, well washed before addition to the gelatine.

In my first experiment, after mixing a solution of silver with its equivalent of bromide of potassium, the precipitate was washed clear of the nitrate of potash, at the same time carrying away all free silver or bromide that might have been unconverted. I added a trace of bromide to the emulsion, whilst mixing it, to ensure cleanliness rather than speed in the negative. The negatives, or rather transparencies (as I prefer to test the quality of a process from a standard negative which I invariably use, and a constant quality of light), being printed at a distance of five inches from a gas jet by superposition, were found to be much slower than a collodio-bromide plate would have been under the same conditions of light. As an excess of silver added to a collodio-bromide emulsion is conducive to sensitiveness, I next prepared some bromide of silver, washed as before, mixed up with the gelatine in a mortar, and added two grains of silver to the finished emulsion. No image appeared on development. I tried another plate; the result—*nil*.

Suddenly recollecting that Major Russell had told us that a bromide plate freed from all soluble bromide would not develope, and knowing that to be the case in this instance, it is more than probable that neither a gelatine or collodion emulsion can be made from precipitated and washed bromide of silver. Indeed the experiments recorded by Mr. M. Carey Lea, in his last week's contribution to this Journal, point distinctly to this, and go a long way to prove that the so-called "advanced" emulsion workers have only been dealing with the shadows of clever discoveries.

Making a gelatine emulsion in the manner laid down by Mr. King is doubtless the way always to ensure success; for, if nitrate of silver and bromide of potassium be mixed either in their exact equivalents or with a slight excess on either the side of free silver or free bromide, and be added to the gelatine separately, the emulsion will contain both free silver and free bromide. Although the action of dialysis tends to wash away any free salts which may be in excess, the gelatine seems to check the complete action of the free salts in forming bromide of silver, just as collodion may hold for many days, and possibly for weeks, both free silver and free bromide, the action of the one upon the other being extremely slow in proportion as the very small amount left unconverted is distributed throughout the whole solution (either collodion or gelatine).

My experiment with the dialysing process was with forty grains of Nelson's gelatine dissolved in one ounce and a-half of water, twenty grains of bromide of potassium in two drachms of water, and thirty grains of nitrate of silver in two drachms of water. The bromide of potassium solution is first mixed with the warm solution of gelatine, and then this is added in very small quantities, by the aid of a silver teaspoon, to the silver solution, which is placed in a mortar and ground vigorously until the whole of the bromised gelatine is intimately mixed with it and formed into a creamy paste. A small, or rather an ordinary, jam pot formed my dialyser, the septum being that which has been recommended—parchment paper, perfectly free from small holes. The prepared gelatine being poured into the dyaliser, a flat plate is placed in a dish of water, there being only sufficient water to just cover it. On this the dyaliser is placed, and if the plate be shallow—say a quarter of an inch deep—it will be a gauge to point out how high the liquid rises inside the dialyser, for if it be above the surface of the gelatine it goes to dilute the emulsion; the plate thus forms a stage to keep the gelatine emulsion from becoming submerged. The water by this means is plentifully supplied, so that the few grains of nitrate of potash that would cause crystals on the coated plate are distributed throughout a comparatively large volume in the dish surrounding the plate.

Now this water must be kept comparatively warm, so that the gelatine cannot set too much. My plan is to place the whole apparatus in the plate drying-box, light the Bunsen's burner, applying heat sufficient to keep the water slightly tepid, and in three hours you can coat your plates, for the gelatine will be perfect. I have previously explained a very handy mode of dispensing with all levelling, &c., for this purpose. My first idea of a plan for doing this piece of work was to place the dialyser containing the gelatine on the dish of water in the kitchen oven the last thing at night, and to take it out in the morning; but I found this method washed the gelatine too free of soluble bromide, so that the negatives were both insensitive and difficult to intensify. The drying-box plan is the best, and leaves nothing to be desired.

Another thing I have found out. The parchment paper is neither the cheapest nor the best form of septum, bladder being by far the most perfect; for the former, however free from visible holes, allows the gelatine itself to percolate in small quantities, and as a sheet the size of The British Journal of Photography costs at least threepence, in point of economy it is inferior to the latter, for a large bladder costs but twopence, has more than double the surface of the parchment paper, and is superior to it in working qualities.

To preserve the gelatine in a desiccated form is simple in the extreme, and does not encroach on any patent rights. On untying the septum from the dialyser (supposing it to have stood some time in a cool place) the gelatine adheres to it in a pearly jelly. By passing the blade of a silver fruit-knife under it, and turning it out on two or three thicknesses of blotting-paper (it may be divided into halves or quarters before doing this), placing it in the drying-box and applying a strong heat until sufficiently desiccated, it can be tied up in the piece of blotting-paper, to which it will probably adhere; or, as the septum of bladder is so cheap, it can either be cut up as before, or dried adhering to the septum. Whatever adheres to it need not be separated, as it will require filtering before it is again made into an emulsion. It is often much easier and simpler to actually perform a piece of work than write a description of how to do it. The gelatine emulsion process is one of those things that can be condensed into homœopathic proportions in a *viva voce* description of it; yet to write it out in every particular would necessitate so many directions that many would be afraid of trying it. No one need be doubtful of succeeding with this, for the operation is very different to making collodion or manufacturing pyroxyline.

Before closing my remarks on this subject I will take this opportunity of endorsing the views held by Mr. Carey Lea respecting some of the properties which a chloride confers on a collodio-bromide emulsion. When that gentleman first suggested, or rather directed us, to add *aqua regia* with an excess of silver to a collodio-bromide emulsion, only a very few hours had elapsed before I was in a position to confirm the importance of the discovery. The plates were very sensitive, and the quality much improved. I have tried nearly if not every modification suggested to improve this emulsion process, and have never yet found anything to surpass the quality of plates prepared with *aqua regia*. A pure chloride added to the emulsion with an excess of silver has always turned out unsatisfactorily. I have never accepted one or two mishaps as being decisive against a process; and, as I suppose other people's experience to be something like my own in this matter, it is more than probable they would adhere to what gives perfect results. I therefore infer, as Mr. Lea does, that a chloride in some shape or other finds its way into all commercially-prepared emulsion plates. Mr. Sutton, if I recollect rightly, did not succeed with a chloride until it was added in the shape of hyrochloric acid. With a substratum of albumen I should certainly never think of leaving out the *aqua regia*.

This brings me to another idea that I have had in my mind—to treat the gelatino-bromide emulsion with an excess of silver and *aqua regia* after the dialysing process has been completed; otherwise the excess would be washed away. I intend, in a week or so, to report upon this suggestion, after I have tested the matter crucially.

J. W. Gough.

DOUBLE NEGATIVES.—KIRK'S PATENT.

In consequence of some remarks which I made a few weeks ago in a letter to this Journal on the subject of taking double negatives, one on each side of the glass plate, I have received the following interesting communication from Mr. Joseph Kirk, a professional photographer at Newark, in the United States, accompanied by some very fine specimen portraits done by the process, which he describes, and which I here subjoin.

It has occurred to me that the plan of taking a double negative may prove to be useful when a very rapid collodio-bromide emulsion is employed which will only give a thin negative, and I commend the idea to Mr. Mawdsley and all others whom it may concern. With a thin negative upon each side of the glass plate there is little doubt that sufficient printing density would be obtained, and in this way very rapid dry plates might be prepared by the emulsion process. Nothing would be easier than the coating, washing, and developing of such plates by the alkaline method, and they might be easily packed as dry plates, with bands of cardboard between. We should then have, instead of a red pigment, a second sensitive film, which might be stained with aurine. Such plates might, perhaps, be called with propriety "double sensitive dry plates." An experiment or two would soon settle the question as to how such plates would answer for landscape as well as portraiture.

With respect to Mr. Kirk's difficulty of keeping down intensity in the common wet process, the simplest way of doing this will be, I think, to add water to his iron developer and flood the plate with it, so as to wash off the free nitrate. He ought also to omit the sugar which he adds to the developer.

Thomas Sutton, B.A.

Newark, N. J., February 3, 1874.

Mr. Sutton.—Dear Sir,—I notice your suggestion, in The British Journal of Photography, to coat a plate on both sides and develope the same with a view to getting a double image. I desire to say to you that it is an accomplished fact. I discovered the idea a number of years ago, and experimented with it; but, not being as successful as I would desire, I gave it up until about a year ago, when I tried it again with better success. I got results that were very encouraging, and so I continued to work it with such results as to induce me to secure it by letters patent in the United States. I continue to work it now for my customers, and it gives very great satisfaction.

I still think it is capable of being improved upon in more skilful hands. I enclose you my method of working, also a formula; although I do not feel satisfied with it I succeed very well. My principal object is to keep down intensity. When I get a formula that will do that and work clean in the shadows I think the end will be accomplished. I will send you a package of specimens apart from this, and would like to have you show them to the fraternity.—Yours, very respectfully,

Joseph Kirk.

Formula for Making Kirk's Patent Double Negatives.—In submitting my new process to the photographic fraternity I feel confident in saying that, if those who use it will give it a fair trial, they will be satisfied as to the result.

Albumenising Glass.

Albumen	2	ounces.
Ammonia	½	ounce.
Water	70	ounces.

Filter, and flow the solution on both sides of the glass, and keep free from dust.

Collodion.

Iodide of potassium	128	grains.
„ cadmium	168	„
„ ammonium	40	„
Bromide of cadmium	180	„
Anthony's snowy cotton	1	ounce.
Ether	36	ounces.
Alcohol	36	„

The above collodion is very good for ordinary work, but requires a little age, or, if used immediately, a little old collodion may be added.

Should you desire to make *double negatives*, take a separate bottle of the above collodion and reduce it one-quarter with ether and alcohol. This you use for the front (or face) of the plate. Then take another bottle of the same collodion and reduce it with alcohol about one-third; this you must use for the back of the plate, which must be coated first, the additional alcohol preventing the film from setting too quickly while coating the other side. When coating the plate on the opposite side pour off at the same corner which you poured the first from. Give all attention to the front film, and be as expeditious as possible.

Dipper and Plate-Holder.—Bend the prongs of a rubber dipper to a slight curve, so that when the plate is placed on it the top edge will just touch. To prevent the back film from being injured by the spring on the door of the plate-holder I provide another plate with four wafers, made by melting gutta-percha, and placing a little on each corner, which I back up with. Then expose about the usual time.

Developing.—I have tried several methods of developing but find pouring the best, which I do first on the front and then on the back, without changing the position of the finger and thumb which I hold the plate with; this requires a little practice, and you can experiment with a bottle and water.

The impression on the back of the plate is governed very much by the consistency of the collodion film on the front. If thin and transparent the back will be much impressed, and *vice versâ*. Here the operator must use his judgment. Should the picture come up hard reduce the collodion as much as it will bear without working dirty, or give more time in the camera. The developer I use has a small amount of acid. Alcohol is substituted in its place with a view of keeping down intensity. By this means you will always be certain of a soft image on the front and full of detail, while the back will make up the strength. When the negative is developed and washed pour a solution of gum-water upon the back film. This will be sufficient to protect it while printing. I confine myself principally to Berlin and imperial cards, 4 × 4 and 8 × 10 busts.

Developer.

Iron	1	ounce.
Sugar	½	,,
Alcohol	3	ounces.
Acetic acid	1	ounce.
Water	32	ounces.

Shirt-bosoms, white lace, and drapery may be worked on the back of the negative with a sharp point.

I find this process very useful in enlarging old photographs and tintypes in avoiding rough texture.

THE WASHED EMULSION PROCESS.

It is now two months since I published this modification of the collodio-bromide process, and the interval has been spent in continued experiments. The experience thus gained has not only confirmed me in the very high opinion I had then formed of this method of working, but, as a matter of necessity, has suggested many little improvements in the minor details of the manipulation. As the outdoor photographic season is now rapidly approaching, I wish once more to lay before amateur dry-plate workers the advantages of a process which, once tried, will not, I am very sure, be relinquished.

The only objections I have heard raised against the process are the extra expense of the double quantity of solvents and the trouble of preparing the pellicle. As regards the first, I stated in a previous article that, in my method of working, the additional cost of twenty ounces of emulsion prepared from my dried pellicle was thirteen or fourteen pence, and this is a full estimate. Looking at the matter in a "pounds, shillings, and pence" light it will be interesting to work it out to its full extent, and see what the extra cost (if any) really amounts to.

Twenty ounces of emulsion I calculate to represent fifteen or sixteen dozen 7½ × 4¼ plates. I find I can coat three dozen plates that size from four ounces of emulsion, with a little to spare. However, leaving the balance out of the calculation, we will take twenty ounces to represent fifteen dozen plates. The time occupied in preparing the plates in the old style cannot, I think, be reduced below an hour for a single dozen, and few amateurs prepare more than that number at once except on rare occasions. By my plan I can prepare a dozen plates in a quarter of an hour—a clear gain of forty-five minutes, to say nothing of the trouble I avoid in the way of washing, draining, "organifying," and drying. In using up my pint of emulsion I should thus *save nearly twelve hours at an extra expenditure of thirteen pence.* I need say no more on the subject of additional outlay; I am only surprised to have heard it seriously urged as an objection. As regards the question of trouble in preparing the pellicle: I would rather prepare sufficient for a pint of emulsion than go through the operations of coating, washing, preserving, and drying a dozen plates in the ordinary way. The trouble is infinitely less, however formidable the description may look on paper; and the time occupied, if the different operations could be performed one after the other without any break, would also be less.

Suppose, for instance, it is desired to prepare a quantity of the collodion pellicle. Presuming the collodion to have been previously made, the first operation will be the sensitising. In this it makes but little difference whether the quantity be two ounces or twenty, the time occupied and the trouble exercised being little more in one case than in the other—from five to ten minutes probably sufficing for the whole operation.

After a rest of some hours the next step is to pour out the sensitised emulsion, previously filtered, into a dish or other suitably-prepared receptacle, and allow the solvents to evaporate. The filtering of a pint of emulsion occupies but a few minutes, and the mere act of pouring it into a dish is even less trouble than coating an ordinary plate.

After another rest of a few hours the sheet of collodion is divided into pieces of a convenient size, detached from its support, and transferred into a vessel of water. Here, again, the labour is infinitesimal, and the time occupied two or three minutes.

The washing is the only operation which requires time, and even this may be thoroughly effected in less than half-an-hour, if desired. The vessel I use for that purpose, and which I find most convenient, is one which I was fortunate enough to "pick up" at a druggists'-sundries shop, the cost being sixpence. It is of earthenware, holding about half-a-pint; the bottom is perforated with small holes, and, as I was informed by the shopman, it was intended for use as a "coffee percolator." This "percolator," containing the pellicle to be washed, is placed in a basin, which is then filled to within an inch of the top with hot water. After soaking about five minutes the percolator is lifted out, the water escaping by the perforated bottom, the basin emptied and refilled with fresh water, and the soaking repeated as often as may be deemed requisite. By this means the solid portion of a pint of emulsion may be freed from all soluble matter with the greatest ease in less than half-an-hour, without the slightest risk of losing any portion of the pellicle, or of injury arising from handling with fingers which may have been in contact with deleterious chemicals.

When sufficiently washed the sensitive pellicle is pressed between folds of clean filtering-paper, and dried in a hot oven or the usual plate drying box. When dry it may be preserved in a wide-mouthed bottle, and is ready for use at any time.

It will thus be seen that the actual time expended in the preparation of a considerable quantity of the pellicle is really less than an hour, while the manipulative skill required is much less than in the case of coating and washing a few plates; and, when it is considered that the time and trouble thus employed represent, or rather replace, the subsequent washing of several dozen plates, some idea may be formed of the advantages of my method. However much care may be exercised in the preparation of plates a small allowance must always be made for films damaged through accidents in washing and drying. These, of course, cannot occur where there is no washing, so that I may claim a still further economy of material. The pleasure experienced in the preparation of plates without the concomitant annoyances of the operation I have not taken into this calculation. To adequately represent in pecuniary or other terms the value of one's personal feelings would, I imagine, be beyond the philosophy of an Adam Smith.

Having said thus much on the economics of the process I will now turn to the practical side of the question. Naturally the first point which claims attention in an emulsion process is the pyroxyline. In this case, however, there is less need to attach any ultra importance to that matter, as the first stage of the process is the formation of an emulsion suitable for use in the ordinary way. Any cotton, therefore, which will work well in the ordinary way will be found equally well suited to this process.

The same may be said, to a certain extent, with regard to the method employed in sensitising; though on this point I would offer a few remarks. An ordinary emulsion is known to pass through various stages of sensitiveness and density, until it becomes useless from age. When newly sensitised it gives a film thin, transparent, and beautifully free from "structure;" as it "ages" the film becomes denser and less transparent, the suspended bromide appearing to conglomerate into larger particles, while, for a certain time, the sensitiveness increases. These changes are more noticeable in emulsions containing free silver restrained by an acid, and the length of time required for the attainment of the highest state of sensitiveness will depend in some degree upon the quantity of free silver present. It is obvious that such an emulsion will go on increasing in sensitiveness up to a certain point, and, as no means exist of keeping it in its most perfect state when attained, its working powers commence to retrograde. The highest point of sensitiveness is usually gained in from twenty-four to forty-eight hours from sensitising, after which, though it may continue to work for some considerable time, it loses that freshness and vigour which mark an emulsion in its best condition.

Now, the peculiarity of an emulsion made from the dry collodion pellicle is that whatever its character may be when newly made such it will remain. An emulsion giving a transparent film when fresh will at the end of some weeks (I have not yet tested it further) still exhibit the same characteristics. Though the greater part of the bromide may subside to the bottom of the bottle—which it does with greater rapidity in this process than in any other I have tried—it will, when shaken up, produce a film so even as to appear more like a *stain* than a layer of particles of bromide. On the other hand, if the new emulsion be dense and semi-opaque, these qualities remain, neither sensitiveness nor density changing in the least. The inference to be drawn from this is that the first emulsion should be poured out and dried when it has reached such a stage as shall be deemed its best. This must, of course, be a matter of careful judgment, and probably each photographer may have his own idea as to when an emulsion is in its best condition. Many, I know, consider an emulsion is not "ripe" until it has reached the semi-opaque or "creamy" stage. This, I think, is wrong. The emulsion may not, perhaps, reach its most sensitive condition until it becomes "creamy;" but I would prefer to sacrifice a little sensitiveness to secure brilliancy and, more especially, a finer texture of film.

A mental comparison of the bromide process with the bath and an emulsion sensitised with an excess of silver (the excess afterwards neutralised) has suggested to me a method of combining increased sensitiveness with fineness of deposit. A slight glance at the circumstances under which the bromide is formed in either case will show that they are widely different. The difference may be summed up thus:—In the former case the organic portions of the film are exposed to the action of a *strong* solution of silver for a *limited* time, while in the latter the collodion is subjected to the *prolonged* action of a *very weak* solution. Some nine or ten years ago Major Russell noted the fact that a bromised plate, when allowed to remain a certain time in the bath, gave a clear, transparent film; but if allowed to remain for a lengthened period it became semi-opaque, in which state it fogged under the developer. Now, a plate sensitised for ten minutes in an eighty-grain bath becomes exquisitely sensitive before it has time to reach the semi-opaque stage, while an emulsion containing (say) five grains of free silver to the ounce becomes "creamy" before its most sensitive point is reached, and is, besides, not sufficiently rich in silver to give anything like the sensitiveness of the bath plate.

It is, of course, practically impossible to make an emulsion containing eighty grains of free silver; but still much may be done in the direction of increasing the excess. I am now making some experiments in this direction upon which I hope to report very shortly; meanwhile, I may say that I have every encouragement so far to hope for complete success.

In speaking of excess of silver in an emulsion I would have it understood that I mean simply a *temporary* excess; for, while I recognise the benefit which accrues from the action of the silver upon the organic matter, I have never been able to produce any satisfactory result with emulsions which contain no free soluble bromide.

In sensitising the emulsion for the collodion pellicle I recommend the use of as large a quantity of nitrate of silver as can be conveniently used, to be afterwards neutralised by the addition of bromide of cadmium in solution, in preference to bromised collodion as usually employed. If the original collodion be weak in pyroxyline, however, the latter plan had better be followed; but in that case the collodion thus added loses the benefit of the action of the silver, and weakens the effect in the complete emulsion.

In my previous article I stated that the emulsion might be allowed to remain in contact with the silver for forty-eight hours or more. I would suggest now, as the result of recent experience, that *twenty-four* hours be made the limit, and, after the addition of the necessary bromide, the mixture be washed and dried in as short a time as possible. I may mention here that, in sensitising, a very much larger quantity of water may be used in dissolving the silver; in fact, it is not necessary to use alcohol at all. I have, for the sake of experiment, added as much as half-an-ounce of water to four ounces of emulsion, and, though before washing and drying it refused to make a film, it produced a finished emulsion without fault as regards structure.

The length of this communication precludes the possibility of my going into the further stages of the process this week, so I must defer it until a subsequent occasion, trusting that some may, meanwhile, be induced to "go into" the process for the coming season. I have the more confidence in saying this because I am not thrusting my modification into the field to the exclusion of anybody else's pet process. If you work the collodio-bromide process pure and simple, combine it with this and it is still collodio-bromide. Do you favour chloro-bromide? Then try the effect of a further modification. Do you use uranium? It will wash out of a pint of emulsion as easily as from a single film. In fact, if you have any particular "fad" whatever, it will be improved, inasmuch as the preparation of plates will become a pleasure, instead of a sad nuisance, as used to be the case sometimes.

W. B. BOLTON.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.

I OBSERVE that Mr. M. Carey Lea, in some remarks on the new process of Mr. Willis, expresses himself as uncertain concerning the permanence of platinum prints, citing, as a reason for expressing this dubiety, the experience of Mr. Robert Hunt in connection with prints of a somewhat similar character arrived at more than thirty years ago. Now, I am not quite certain if Mr. Hunt ought to be accepted as an authority in new school matters. Some of his ideas respecting lenses, reiterated in several editions of his work on photography, are pooh-poohed by modern opticians, and, as a matter of fact, are really incorrect; why, therefore, may not his *dicta* in connection with chemical matter be also incorrect? Not for a single moment would I have it to be inferred that the excellent Professor Hunt would state that which he did not believe to be quite true, but that he may have come to a decision upon imperfect *data*. Photography has grown much since 1844—the date at which Mr. Hunt's *Researches on Light* was published; and statements found in that work to be in non-agreement with the experience of more modern times must be received with such caution as is required by better knowledge of the conditions under which such effects are produced.

What, may I ask, is a test for a platinum print on plain paper? I imagine that such tests as are applied to silver prints on albumenised paper—such as their exposure, while damp, to the products arising from the combustion of common gas, or to sulphuretted hydrogen or the fumes of sulphide of ammonium—will not produce much effect upon pictures of the platinotype class. By what means, therefore, are we in a position to decide whether the Willis pictures are permanent or not? But, again, wherein does permanency consist, and what are the proper tests of this quality? Even burnt-in enamels, when subjected to the test—that of being ground under the heel—suggested by a speaker at the great Brighton dinner in 1871 will be found wanting. What, then, should be regarded a a proper test for permanence in a photograph?

A thousand blessings upon the Liverpool Photographic Society! In 1864 John Glover died. His services to photography are on record, and need not be referred to by me. This Society collected about £300 on behalf of the widow and family of this excellent man, and the trustees had been enabled to give to the family £32 per year. This having been done for nine years, the children are now educated, and able to support themselves. Who would grudge such a society and such trustees their warmest acclamations?

Will any person be so obliging as to tell me the meaning of the word "aplanatic?" I am not at all unconscious of the fact that it is said to be "without error;" or, dipping still deeper into optical science, that it is applied to a lens in which spherical, in contradistinction to chromatic, aberration is absent. M. Derogy has, I find, been exhibiting at a meeting of the Photographic Society of France some of his lenses, which, he says, are aplanatic. I want to know in what respect a lens which is aplanatic differs from one which is not so. I am told that by one of the former class a sharp picture is obtained without a stop being used, and I know that one of the latter will give a sharp picture if a stop be used; hence, if one of the latter have its diameter reduced to the dimensions of the stop which was required to give it sharpness, ought it not, then, to be considered aplanatic? In my opinion the word is a misnomer, and an answer cannot be given to the question—"What is an aplanatic lens?"—until it is first decided what relation must exist between the diameter and focus of a sharp-working objective before the latter can be termed aplanatic. The word should be banished from our nomenclature until it has been properly defined.

Can it be that anything I have said in these random notes has proved instrumental in eliciting from Mr. Sutton the fact that the famous French process for colouring prints is not new? If so, I am really very——well, *not* sorry. But what, in the name of all that is photographic, is the other new process of colouring hinted at by Mr. Sutton? Nothing, he says, can stand against it—not even coloured photo-enamels. I am tempted to inquire if Mr. Sutton, who evidently knows the process which he has announced in such glowing terms, is to divulge it of his own accord, or only after I, or some other person, give a clue to it. The nice thing to do would be for your French correspondent to immediately make a clean breast of it himself, or tell us at once that it is a secret process and accessible only to those who will consent to pay specially for the information. In either case our minds would be more at rest than is now the case. But surely Mr. Sutton has no sympathy with secret processes; hence he will doubtless have published this colouring process ere I again have an opportunity of coming before my readers.

I don't quite see that transparent paper is a *sine quâ non* in gelatine emulsion photography. Why not use common non-transparent paper? "Oh!" it will be said, "it is not transparent." Well, granted that it is not—what then? A slightly-increased exposure in the printing-frame is the only drawback attending its use. As for the grain or texture of the paper, all I ask of any objector to my suggestion is that he strip a negative collodion film from the glass plate upon which it was formed and take two prints from it—one with a sheet of really good paper interposed between the film and the light, and the other without such an addition; then compare the two pictures with the special view of discovering any grain or texture arising from the superposed paper.

I regret much to learn of the death of Caroline, wife of Mr. William Downey, of Eldon Square, Newcastle-on-Tyne. To the care, forethought, and tact of this lady was due much of the success of Messrs. Downey's firm. She died while yet in the prime of life.

Rumour says that Colonel Stuart Wortley has received a permanent appointment in the Patent Museum. Let me express a hope that he will not give up photography; but, while fulfilling the duties of his new career, still find time to retain his affection for his old love—photography. It is every way desirable that Colonel Wortley should continue his endeavours to promote its progress and extend its usefulness.

The South London Photographic Society appears to be somewhat "hard-up" for papers; otherwise how came it to pass that a short paper from Mr Fry was accepted gratefully after he had only a week or two previously published the gist of it *in extenso* in one of the journals? But perhaps there is more than *one* Mr. Samuel Fry who has been erecting a new studio.

Who was the inventor of secret process-mongering? If *he* had obtained a patent for his invention, would'nt he by this time have been a millionaire! Americans having come to this country to vend their processes, I observe that some of our own countrymen are making an attempt to return the compliment. And why not? I have recently purchased a five-shilling manual on ceramic photography, and I wish to know in what respect it is illegal for me to dole out the information thus obtained and paid for to my verdant cousins on the other side of the Atlantic for as many dollars as I can get? The idea is not to be "sneezed at!"

HELIOCHROMY.*

After lying in the bath previously described for five or six minutes the paper is dried with blotting-paper, and then placed behind a picture on glass. If the work be done in sunlight the thickness of the glass will have but little effect on the sharpness of the impression, on account of the great rapidity with which it is made; but with diffused light the image will also be quite diffused. In that case it will be better to apply the paper to the obverse of the plate, interposing between it and the image a sheet of mica or any other thin and transparent substance. Or the following artifice may be used:—Paste round the edges of the coloured glass bands of moderately-thick paper about a quarter of an inch broad or rather more. The prepared sheet must then be applied, while wet, to another glass and sponged down. This glass may then be laid against the paper framing on the coloured picture, which will thus keep the sensitive paper at a sufficient distance from the model not to injure its colours, and yet not far enough away to injure the sharpness of the impression. On the frame being exposed to light the paper will whiten rapidly, and the print should be considered ready when the high lights have become perfectly white. When this is so the frame should be at once withdrawn, prolonged exposure endangering the loss of the print. The image is then plunged into water or alcohol, which removes the excess of the sublimate, and in this state it may be subjected to the influence of diffused light for some minutes, and will keep a long time in an album.

These are the operations; and now comes the question of the theory of the formation of the image. At its removal from the mercurial bath the paper is impregnated with mercuric chloride, which is reduced by the light and gives place to *mercurous* chloride and free chlorine. This last is taken up by the subchloride of silver, which it transforms into white chloride. At the same time the subchloride not attacked assumes a peculiar physical condition, which permits its impression with the divers-coloured rays.

The excess of mercuric chloride having been eliminated by washing, the image is composed then of chloride of silver, of subchloride in a certain physical state, and mercurous chloride. The calomel may be transformed into sublimate either by the aid of chlorine water or by means of *aqua regia*, and may then be washed away by repeated waters. In the last analysis the image is therefore formed of chloride of silver and a subchloride of the same metal; and it will be seen further on how to attempt the preservation of these substances from all ulterior change.

If a sheet coated with subchloride of silver and sensitised in nitrate of mercury be allowed to bleach completely in the light it may be silvered and blackened anew in the light, and will then become susceptible of receiving coloured impressions as before, after having passed again through the mercurial bath.

By a simple process, due to M. Lassaigne, it is known that photographic positives may be taken direct.* The process consists in the immersion of blackened photographic paper in a dilute alkaline solution of iodide of potassium, then exposing. This plan can be applied equally to heliochromy. It is only necessary to immerse for a few minutes in a bath of iodide, of the strength of about five per cent., the blackened silver paper, having first washed out of it the free hydrochloric acid which it contained. On exposing it to the light, as above, a print will be obtained after a time, the whites of which are formed of iodide of silver, which darkens very slowly under the action of light, even when the excess of alkaline iodine is removed in order to hinder all ulterior action on the subchloride forming the coloured part of the image. Certain superoxygenated acids, such as chromic acid, are reduced under the influence of solar radiation. M. Poitevin's heliochromic process is founded on the reduction of bichromate of potash and sulphate of copper.

It has been demonstrated that the analogous properties of nitric and sulphuric acids may also be applied to heliochromy. If, for instance, a sheet of paper silvered in the usual way and blackened be immersed in a concentrated bath of pure nitric acid for ten minutes, and then exposed behind the coloured drawing, on glass, an image is obtained in a few minutes in the sunlight having very bright colours on a slightly yellow ground, which is due to the action of the acid on the organic matter. The prints are very fine and possess great stability, particularly if the *papier Sutton* be employed. If the subchlorised paper contain an excess of hydrochloric acid there is reason to believe that the released oxygen unites with its hydrogen and forms water. The chlorine in an active state then transforms the subchloride into chloride of silver, and the definitive reaction is analogous to that which takes place with the mercuric chloride. But if, on the contrary, the subchloride be used almost neutral, probably nitrate or nitrite of silver is produced along with a little chloride.

Should sulphuric acid diluted with a small quantity of water be used it gives analogous results—above all, with ordinary paper; it forms then, in the whites, sulphide of silver and some chloride. Some experiments have been undertaken with the aid of the compounds of the chloric series, and it is hoped that accelerating agents may be met with.

As to the action of the extra prismatic rays the following may be of interest:—If the image obtained in the above manner be examined attentively it will be seen that all the colours seem mixed with red and violet. This result should be attributed, as M. Becquerel observed in his learned treatise on light, to the action of the sub-red and ultra-violet rays. The action of these two may be weakened by placing before the printing-frame or before the lens, as the case may be, a tray containing a solution of bisulphate of quinine—a substance which possesses the property of absorbing them almost completely. As to the infra-red rays, they may be absorbed by means of a weak solution of sulphate of copper, so that a mixture of these two products will give good results.

The impression of the prismatic image has not yet been attempted by the means detailed above; but it is probable that it would present no difficulty, and perhaps, even with the imperfect means of fixing known now, some service might be rendered by heliochromy to the new science of spectrum analysis. It is a fact, for instance, that the lines of the spectrum are so numerous for certain metals that it is difficult to form an exact judgment of them on that account. With images presenting a great fineness when obtained on albumen, and which will keep a certain length of time, it would, perhaps, become possible to compare more at leisure the spectra of the different metals. The action of the various artificial lights has not yet been tried on the subchloride, but it is to be presumed that they are susceptible of giving images as well as solar radiations.

* Concluded from page 135.

* The author of the paper is not quite correct here. The remarkable property possessed by the iodides in bleaching the darkened salts of silver was discovered nearly simultaneously by Talbot, Herschel, and D. Fife.—Eds.

It would seem that there is some advantage in adding a small quantity of bichromate of potash and sulphuric acid to the bath of nitrate of mercury; the colours obtained by means of a bath thus modified are livelier.

Although alcoholic baths have been employed in M. de St. Florent's preparations, because they work more regularly and rapidly, it is quite possible to succeed almost as well with aqueous solutions, and these are indeed preferable should albumenised paper be used.

Collodio-chloride of silver, employed either on paper or on glass, may be used for obtaining heliochromic images. The prints on glass are very delicate, but lack intensity. They were produced by Dr. van Monckhoven's formula, and it seems to the writer that the production of stable pictures on glass is the desideratum of heliochromy. If we could only obtain one view or one portrait under these conditions we might look upon it as a negative, so to say, from which an indefinite number of duplicates might be produced in the manner already detailed. Such copies would, however, be reversed, and not the right way as in the original.

The problem of fixing is very difficult to solve completely; but practically it may be considered almost solved if the image is capable of being kept indefinitely in an album, and sustains, without sensible alteration, considerable exposure to diffused light. Some of M. de St. Florent's experiences on this subject are given.

It is necessary to find a fixing agent which will leave the subchloride intact, while yet dissolving the chloride or transforming it into a product which may be easily eliminated. Further: the ulterior reduction of the subchloride forming the coloured image has to be guarded against; and, even when these ends are reached, one cannot be sure of the stability of the print. In the actual state of science it is, indeed, not possible to know how to explain the effects which the subchloride presents under the influence of the active rays, and the ingenious hypotheses which may be made on the subject do not serve as guides in the search for a fixing agent.

It may be remarked, however, that in the majority of cases the image disappears only when the subchloride is altered either by reduction, or in consequence of oxidation; the effort must be, therefore, to preserve it from such ulterior chemical modification—and that is all that M. de St. Florent has tried to do. The image, when taken from the printing-frame or from the dark room, is very unstable; it will disappear in a few seconds in the daylight, and in a greater or less length of time in the dark, in consequence of the continued action of the bichloride of mercury. A simple washing in water will somewhat increase its durability, and it then becomes possible to keep it in an album for a long period.

By the employment of ammonia and alkaline chlorides still more may be done towards fixing the image. If the picture be plunged, after washing, into a weak solution of ammonia, and kept there for several hours, then plunged into a concentrated solution of chloride of sodium and potassium, which is allowed to act as long as possible, and which should be frequently renewed and maintained at a temperature of sixty degrees (whether Reaumar or centigrade is not stated—if the latter, it will be about 107 F., but if the former, about 160 F.), the alkaline chlorides dissolve, especially when warm, the chloride of silver without sensibly attacking the subchloride, so that, on being taken from this bath, the image darkens very slowly in the light, particularly if exposed to it under a new chloride bath. It is well, to begin with, to remove the calomel which the picture contains, and which blackens in contact with the ammonia, or yellows afterwards, more or less rapidly, under the influence of light. This is done, as already said, either by transferring it into mercuric chloride or into chlorised water and *aqua regia*.

Chloride of lead—obtained by double decomposition—in the body of the paper, nitric acid, sulphuric acid, &c., also give a certain fixity to the image. M. Niepce de St. Victor has already indicated for this object a chloride of lead varnish with a dextrine base. Stability is greatly strengthened if the image has been obtained on highly-albumenised or gelatinised papers.

Finally: greater fixity is attained if the print be covered either with a thick varnish or with gelatine mixed with certain proportions of chloride of ammonia and bichloride of mercury, or any other substance capable of freeing an oxidising agent under the influence of light. These, in few words, are the reactions involved:—

Light tends to reduce the subchloride of silver, and also the white chloride, if the latter has not been completely eliminated; consequently, there is a production of free chlorine, which is taken up by the organic matter serving as support, or escapes in the atmosphere. One must, therefore, try to restore to these substances always the proportion of chlorine which they have just lost; and that seems attainable if a compound capable, by its reduction in the light, of giving birth to an oxidising agent—chlorine or oxygen—be superimposed. Hence the explanation of the conservative action of chloric mercury, of nitric acid (very dilute), and of sulphuric acid or sulphate of mercury, as proposed by M. Poitevin.

But it is conceivable that, if the preparation of these compounds be too great in proportion, the oxidising agent which is in excess will set up an ulterior action on the subchloride, and cause the image to vanish. Varnish, albumen, gum, dextrine, and, above all, gelatine will then come in as moderators. It is known that all these substances oxidise under the influence of solar radiations, and that, according to the experiences of M. Niepce de St. Victor, after an insulation of some duration they acquire reducing properties in a very marked degree. This oxidisation consists, therefore, in the liberation of a part of the reducing agent, hydrogen, so that this hydrogen intervenes in the reaction for weakening the effect produced by the oxygen or chlorine on the subchloride. Whether this be the explanation or not, experience has proved that, if a thick coating of gelatine be laid on a heliochromic print not freed from its excess of mercuric chlorine, it becomes sufficiently stable to support without much change an exposure of several hours to the sunlight; and the fact is rendered more striking if a part only be so coated. When the picture is held in the light the part ungelatinised whitens completely in a few moments, while the preserved part resists for several hours, and only whitens slowly. The whole print, however, disappears in time.

The proportion of the oxidising agent is not sufficiently great, so far as the conditions of these experiments allow, to repair the losses of the chloride and subchloride of silver; but it is thought that, guided by the theory of equivalents, it may be possible, with much groping, to arrive at such proportions as will practically render the image quite durable.

PHOTOGRAPHY IN VENICE.

Most of the readers of this Journal have heard of or seen the wonderfully-cheap large photographs which travellers bring home from Venice, and which are purchasable in this country even at lower prices than we seem able to produce them. Possibly to most people such pictures have only suggested thoughts of wonder as to how these things could be done so well and yet be so cheap. But in some, no doubt—perhaps in many—photographs of Venice have power to stir other thoughts, and the marvellous art depicted therein leads the mind to forget the present in the past; for Venice is no city of today. The Gothic tracery and profuse ornamentation—the domes and pinnacles and towers that catch the eye everywhere, and shimmer in the gondola-broken waters of her canals—are no stuccoed hypocrisies born of the *nouvelles richesses* of our time. The great and beautiful and noble monuments which everywhere greet the eye in Venice are the memorials of a beautiful past—a past of artists and of art-loving people who had a joy in their work, and an estimation of true art such as it were vain to look for now; and the fact that all this beauty of stone and painting is of the past is saddening, too. Venice today has long descended from her kingly state; the mighty republic is dead, and the last of her princely merchants has long slept in his carved and gilded tomb. With the discovery of the Cape and of America the commerce of the world took to other routes, and left her lagoons empty of the vessels that bore to her warehouses the wealth of the East. Paul Veronese's "Queen of the Sea" is now but a beggar—a beggar who clings still to the kingly mantle of ermine that betokened the grandeur of her ancestors. The flash of jewels and sheen of glittering equipages have gone; but, as one wanders through her deserted thoroughfares, one meets everywhere in those palaces, those churches and museums, the costliest gifts of art. They are strewn on every side with the most lavish hand, and these force on one's mind most painfully the littleness of the art of the present. There is hardly sufficient taste left to appreciate these noble memorials of a noble people; the artists themselves seem to be gone with the means which sustained them.

According to a recent writer in the *Photographische Mittheilungen* everything in Venice is rapidly sinking into decay. Fire and the attritions of time are, on the one hand, attacking one and another of the art treasures of the city of the Lagoons; but, worst of all, the water is slowly undermining its foundations. Every spire in the city—even the column of the lions in San Marco itself—shows noticeable deviations from the perpendicular, and there the leaning tower of Pisa might find a hundred rivals.

In such circumstances we can well believe that the mission of photography in Venice is a great one. The surpassing richness of its art treasures in stone afford a scope there for the photographer's art which nowhere else exists within the same compass; while the intense interest with which every corbel and boss, let alone almost every palace or pillar within it is in every case viewed must be heightened, and the zeal to obtain adequate record of its art spurred on by the thought that the city, having no more place nor business in the affairs of the world, is slowly settling into a watery grave. Photographs of Venice have a many-sided interest therefore to many people, and not the least is a jealous consideration as to whether the memorial work which photography is so peculiarly fitted to do is adequately fulfilled. That the silver prints supplied so cheaply have been given to fade is now of smaller consequence; for if the *first work* be well done—if the negatives are the product of thought and loving care for the art treasures amongst which the humble copyist works—that defect cannot now, with the permanent processes we have, bar the way. We believe photography is as things go fairly represented in Venice, and that on this score, therefore, there is not much to lament. Yet it is a wonder that not one of our leading English professional photographers has ever devoted himself to the task of thoroughly illustrating Venice; and we cannot help thinking that for those smaller kinds of photographs which we on the whole love best there is still room for such an one to do good work. Whether anyone will be induced to consider that point we cannot say; but we present here some account of the state of architectural photography in Venice, in order that our readers may judge for themselves whether or not its art treasures have been copied as they ought to be.

It turns out that, in point of fact, there are but two photographers in Venice who stand out in any prominence as men worthy to carry out this great work. One has a name of much celebrity, for, as Dr. Vogel's correspondent remarks, few travellers go away from Venice without a pair of Naja's photographs as a memorial; and the other, S. Bertoja, is tolerably well known also, but it is chiefly for the curious "moonlight effects," *à la* Byron, which he labours to produce. For the honest object of seizing transcripts of Venice as it is in all its lavish art and beauty there is but one really prominent and presumably capable man residing there—Signor Naja. Let us see how he goes to work. In the first place, he chiefly relies on dry plates for obtaining his interiors. This is probably largely necessary in buildings like the church of San Marco, and probably in many more private buildings, on account of the feebleness of the light. It is a very common thing to stumble across one of Naja's cameras set up in some such place, with the lens open exposing a plate by the day long, and unattended by any operator.

Naja's mode of working is of the simplest. He has no grand establishment, and only a small studio with a high side light, which he devotes to copying paintings; and even that is but seldom used, for the magnificent paintings in Venice have usually to be taken on the spot where they hang, or the walls where they are painted, and he secures such copies of them as he can by the same means that he takes his other views with—dry plates. The patience and perseverance which he exhibits in this work is certainly very commendable. He appears to have a number of cameras of a large size—for he works plates the size of a sheet of photographic paper—which he places here and there about the city, and allows the films to remain exposed sometimes for days, in order to get a picture. The results, whatever process he may employ, are certainly often very fine, in spite of this mode of operating. There can be no question that it is a trying thing to sharpness and clearness of definition to have to expose a plate three days, as Naja did in the case of Titian's *Ascension of Mary*. In some cases the exposure has been prolonged to five days. Where paintings are in question this may be possible without blurring; but if Naja adopts the same plan with buildings, and takes columns and carved work on which the light must move round during the day, so as to blur and confuse lines and shadows, we can hardly think that the representation he is thus able to give of the interior of a building will prove very satisfactory.

Signor Naja does not, however, confine his labours to Venice. On the contrary, he extends them to the neighbouring cities of Bologna and Verona, and even to Florence—each of these enough for any single man to undertake if the work is to be done lovingly and well. His works, we are told, do not pretend to have any artistic merit, and we must not look for aërial perspective, light and shade, softness, and other similar things in his pictures, for they are not there. What is this but saying that his work is not adequate to the mission photography has in such places? How possibly could the colonnade of the Doge's palace be rendered, or the tracery of its council-room windows, without proper light and shade? You might use plates as large as an opened-up sheet of *The Times*, and yet the results would be unsatisfactory if the picture were without the relief of proper light. Details may seem full in ill-lighted pictures, but they are never accurate.

The fact appears to be that, as far as Venice is concerned, photography is too cheap to be well done, in an artistic sense. If you can buy a 10 × 12 picture for two francs it is clear that the margin must be so slight as to make it utterly impossible for any man to do anything but the crudest and most mechanical kind of copying. Proper light, proper lenses, or proper chemicals can hardly be within the power of the men who are ground down to such a low level. They cannot wait for the first nor pay for the others. Nothing is, perhaps, more significant of the sad decay into which Venice has fallen than this token of the depression of the art there; but because those on the spot do work at so low a rate of remuneration we must not conclude that persons having their centre of business elsewhere could not do finer work and, freed from local stagnation and the pressure of local poverty and decay, get better prices for it.

There is a considerable genuine revival of architecture amongst us in England, and whatever helps that revival in the way of lessons from the past is not a little sought after. But we have ecclesiastical lessons in plenty elsewhere; it is domestic art which lags behind, and that is just what Venice is the most perfect in of all the cities of the world. It is a great storehouse of domestic art and decoration, and as such, although written about and admired and sung over, has never been properly explored with the pencil. The work is beyond the power of an ordinary artist, but the camera might accomplish it; and we think there is a field there for some one who has the resources and the skill to do a work which, in many cases, if it be not done soon will be beyond the possibility of being done at all. What is wanted is a series of exquisite cabinet negatives of Venice—of its monuments, its successive orders of building, its various styles of ornamentation, and its general panoramas. These, with the resources now at the command of photography, might be enlarged or reduced at will, and multiplied to any extent at small cost. Much as Signor Naja has done his system is cumbrous and altogether antiquated and his aims mechanical—guided rather by the whims of the passing tourist than by the wants of the true lover of art. A. J. W.

THE BENGAL EXHIBITION.

In our last number we gave the prize awards connected with this exhibition. We now redeem our promise of supplementing that notice with a more detailed account of some of the pictures exhibited, which w extract from the *Calcutta Englishman*.

Referring to some pictures exhibited by Mr. Beasley our contemporary says:—The series admirably exemplify the capabilities of dry-plate photography, and it seems strange that this branch of the art, possessing so many advantages for amateurs, is not more practised in India than seems to be the case. A prize offered last year for Indian samples of dry-plate photography failed to bring forward a single competitor. We hope that the sight of these most successful dry-plate pictures may stimulate some of our local photographers to go in for dry plates, and work out a reliable and practical process for India.

Of some views in Upper India, by Mr. G. L. Kemp, our contemporary observes that they show how relief and picturesque effect may be gained by the judicious printing-in of cloud effects, instead of the blank white spaces usually representing sky. In many of the pictures scarcely sufficient care has been exercised in selecting and disposing the clouds so as to produce the best effect; and there has been too great a tendency to make them follow the outline of the subject, instead of opposing or breaking it up, and so obtaining relief and contrast.

The views exhibited by the School of Military Engineering, Chatham, are complimented as possessing a beautiful warmth of tone with a rich transparent delicacy, and in these respects surpassing any similar productions in the room. The foliage of the fine avenue of elms in *The Queen's Private Drive, Windsor Home Park*, is effectively brought out, and shows none of the hard, black shadows so commonly seen in such views. The whole series is excellent, and reflects great credit on the instruction given to the military photographers, who are sent from Chatham to all parts of the world.

On the reverse side of the same stand are a fine series of views in the Tyrol, Italy, Switzerland, and on the Rhine, by the well-known photographer, Mr. W. England. For transparency, relief, and pictorial effect these beautiful little photographs are unsurpassed by any in the exhibition. Among so many perfect pictures it is difficult to select the best, but of the Tyrol series, *Nassereit, Weissensee and Mieningerberg*, and *Fenderthal and Thalleitspitz*, appear to excel. The Italian and Swiss series also comprises many charming pictures, some of them of most difficult subjects. *The Valley of Lauterbrunnen* is particularly noticeable for an almost stereoscopic relief and solidity, the different gradations of distance being very perfectly rendered. The whole of these fine photographs are well worthy of attentive study as models of artistic selection.

Among a large collection of views in Burmah and Rajpootana by Messrs. Bourne and Shepherd, who receive a gold medal, though still superior to most Indian landscape photographs, we miss the soft brilliant delicacy and artistic treatment that characterised the earlier series by this well-known firm; and, although the present series are most interesting as illustrations of the scenery and architecture of little-known parts of India, with few exceptions they fail to please as pictures. Their *Avenue of Tamarind Trees* is good, but a little wanting in delicacy. The architectural subjects in the same series, which gain the silver medal for photographs of antiquities, are interesting and good photographs of difficult subjects; but they lack the richness and vigour of some of Bourne and Shepherd's previous productions of the same kind, such as the splendid series of illustrations of the Seringham Temples and other antiquities of Southern India.

The magnificent examples of landscape views enlarged by the Autotype Company from negatives by Mr. Vernon Heath, exhibited by Messrs. C. C. Macrae and J. L. Lyell, are among the finest pictures in the room, and it is to be regretted they are not for competition, as they must undoubtedly have taken a very high place. As admirable studies of trees with and without foliage we may particularly notice *Burnham Beeches*. The old pollard stumps are admirably brought out, and so is the fine horse-chesnut. Such studies should be appreciated by artists as an aid to the true delineation of foliage. *The Trossachs and Ben Venue* is a fine picture. In *Views of the Houses of Parliament, Westminster*, the large size is admirably suited to the subject. The specimens of portraits, also printed in permanent pigments by the same company, show that results may be obtained in every way equal to silver prints, with the immense advantage of being perfectly permanent, and not liable to fade like the best and most perfect silver prints, as is only too plainly shown in looking over the collections in the Society's album, where many pictures that have taken gold medals in past years would not now be thought worthy of mention—bereft of all their rich bloom and beauty, and their pearly-grey half-tints turned into dirty yellow. We are glad that such fine prints have come to India, and hope to see our local photographess adopting some of the methods of permanent printing now making rapid progress in Europe.

The specimens of heliotypes by the School of Military Engineering, Chatham, are excellent examples of this method of permanent printing, and show its capabilities for the reproduction of work of different kinds. Thus, as architectural subjects, *St. George's Chapel, Windsor*, *Rochester Castle*, and *Rochester Cathedral* are excellent in every way, and, for purposes of illustration, would be vastly superior to the best engravings or lithographs. As landscape photographs, two are almost equal in beauty to silver prints. The reproductions of drawings are also good. The specimens of Capt. Abney's new process of papyrotype, or prints from gelatinised paper, are also interesting, though they do not appear to be so sharp as the heliotypes, in which the gelatine film is supported on glass or metal plates. We have seen similar prints produced in this country with perfect sharpness and firmness of line, so that the defect is not inherent in the process, and might be avoided by an improved mode of working.

In the central part of the same stand is a beautiful and interesting collection of Woodburytypes, admirably exemplifying the value of the the process for the production of photographs of portraiture, landscapes, architecture, reproductions of paintings and engravings, articles of *vertu*, &c. In softness and delicacy of gradation they are very superior to the heliotypes and collotypes, and except by the initiated would not be recognised from silver prints. The only drawback to the process is that the size of the picture that can be produced by it is limited; and we believe it has not been found practicable to produce pictures larger than 10 + 8, or 12 + 10. But even within these limits there is a vast field of usefulness for it, and it is already very largely applied in England and France for the reproduction of copies of paintings and many other purposes of book illustration. Among the Woodburytypes we may particularly notice No. 189, a very perfect illustration of an Indian architectural subject, the largest of the series. The portraits of the Claimant, his Counsel, and Judges are of interest at the present moment. The views of Holland House are very good; so also are the reproduction of paintings, drawings, and engravings. The photographs of old china have a peculiar pale blue tone, admirably suited to the subject. The judges have very deservedly awarded an extra silver medal for these beautiful pictures.

Facing these are some excellent examples of photolithography by Mr. J. Noone, Government Photolithographer at Melbourne, Australia, particularly clear, sharp, and firm in the lines, and we are glad to see that they have obtained honourable mention.

Next to these are several specimens of photocollotypes, exhibited by the Photographic Branch of the Surveyor-General's Office, illustrating the value of the process for various purposes. The copies of maps are the best, but considerable progress has been made in printing in half-tones, though some of the landscapes are a little wanting in delicacy.

The whole of these specimens of permanent printing—autotypes, heliotypes, Woodburytypes, and collotypes—are particularly worthy of attention, as examples of methods that are making rapid strides towards the complete extinction of the old and unstable processes of silver printing. While the silver printing remains the same, every year sees improvements in these processes, and a diminution in the obstacles and difficulties that hinder their general adoption. We look forward to the time when silver prints shall be the exception instead of being the rule.

In portraiture, as might be expected, the finest specimens are from England, but the local contributions are unusually numerous, and many of them are in their way quite equal to the best work done in Europe; and we imagine that, besides the difficulties connected with the climate, one cause of the deficiency of large specimens from our local artists is the want of an appreciative public prepared to pay highly for such productions. The English contributions are not so numerous as last year, but it is noticeable that the influence of the prizes offered by Mr. Crawshay for the best portraits of large size taken direct or enlarged is very marked, and the majority of portraits sent out this year are either full or about half life-size. That this is a move in the right direction there can be no doubt, but as yet the results cannot be considered quite satisfactory; though we note a great improvement, which will, doubtless, be further stimulated by the renewal of Mr. Crawshay's munificent offer.

To the left of these are some exceedingly fine portraits by Mr. Marshall Wane, to whom we are glad to see the judges have awarded an extra gold medal. They are better than any ever exhibited in Calcutta, and rival in all their best qualities the exquisite little portraits exhibited by Luckhardt last year. The only defect we can see in these portraits is the distinctness of the retouching in the faces both of the large and small portraits.

The portraits by Messrs. Bourne and Shepherd, though showing no marked advance or novelty in style, well maintain the high reputation of the firm, and have gained a silver medal as the best portraits taken in India. We notice a few of the so-called "Rembrandt" effects, which are at least as good as anything of the kind done elsewhere.

The groups by Westfield and Co. are all very good, particularly those of the Siamese Ambassadors and the Japanese troupe. The specimens of *carte-de-visite* and cabinet portraits comprise some excellent work, particularly the cameo vignettes, some of which are as good as anything we have seen of the same kind from European studios. Mr. Westfield has been unusually successful in his portraits of children.

Captain B. Swiney has not come forward so well as last year, but sends a few examples of combination printing which are interesting and suggestive.

Turning to the reproductions of works of art, we observe that they are more numerous and more varied in their character than is usually the case. Thus we find not only copies of pictures, but examples of reproductions of sculpture, as well as of Indian silversmith's work, shawl stuffs, and brocade tissues.

The first to notice are the reproductions of Indian fabrics by the Photographic Branch of the Surveyor-General's Office, comprising reduced copies of Cashmere shawls, brocade, doputtas, &c. We only regret that photography is unable to render the tasteful colouring that distinguishes the best productions of the Indian loom with the same perfection as it does their texture and pattern.

The admirable series of photographs of statuary by Mr. W. England merits particular attention for the delicacy and perfection of light and shade which characterise them. At first sight it would seem child's play to photograph such subjects; but the manipulation of both negatives and prints, so as to produce the effect most suitable to each subject, and the proper direction of light and shade, so as to produce relief, and bring out the beauties of the work without deep black shadows on the one hand or flat blank whites on the other, demand considerable technical skill and artistic taste, and we quite agree with the judges that these beautiful pictures are worthy of the award of an extra silver medal.

On the same stand, to the right, are two little *genre* pictures by Mr. J. Hubbard, of London, well deserving of notice. They are entitled *Stolen Moments* and *Thinking it Over*, and tell their own stories very effectively. These beautiful little pictures admirably show the capabilities of photography in this direction, and we only regret that there are not more of them, so that they might have received more than the honourable mention of the judges.

We cannot conclude this notice of the exhibition without expressing our disappointment at the want of evidence of progress in this country, either in the artistic or technical applications of photography. There is an immense and almost untrodden field for the exercise of the art in directions peculiarly adapted for amateurs; but we see few signs of any inclination to go out of the beaten track, or to do anything more than go over again what has been done before. We should like to see more illustrations of Indian ethnology, natural history, botany, manufactures, and industrial arts; more views chosen rather as pleasing pictures and artistic bits than as well known places; and more examples of new processess.

Correspondence.

Albumen in Chloro-Bromised Plates.—Comparison of Several Processes.—Albumen as a Substratum.

More than four years ago, whilst experimenting with the collodio-bromide process, I made a number of trials of *albumen* in connection with it. Some of the results which I obtained were exceedingly satisfactory. I did not publish them; for I regarded them as incomplete, and postponed the matter till I should have finished other trains of investigation, but the time never came. Within the last year or two I have been much impressed with the influence of albumen on my films, and now propose to give the matter a careful study. In my note-book of the period above referred to I find the following formula noted as having given the most satisfactory results out of many that were tried.

The emulsion plate, after having lain in water till the greasy marks were gone, was poured over with the following solution :—

Water	1 ounce.
Gum	20 grains.
Sugar	5 ,,
Dilute albumen	1 ounce.
Solution aluminic acetate	10 minims.
Liquid ammonia	30 ,,

The dilute albumen was prepared by shaking up the whites of two eggs with five ounces of water. The aluminic acetate was the commercial solution as ordinarily sold.

In reviewing this formula I conclude that there was too much of both albumen and ammonia, also that it would probably be improved by the addition of pyrogallic acid; but at the time I speak of I had not found out the value of pyrogallic acid for the treatment of dry plates.

It seems also probable that salicine, either with or without pyrogallic acid, would be useful, as also the staining of the film with coralline instead of litmus. All these points I propose to study out, and shall take pleasure in communicating the results to your readers.

Comparative Results.—In reviewing recently a very large number of dry-plate negatives I find that the very best that were obtained were, amongst the earlier, those to which litmus was used, and amongst the later, those made with pyrogallic acid. The latter are the more sensitive; the exposure is shortened, but the resulting negative is not better, though equally good. These negatives include plates made by a great variety of dry processes, with and without a negative bath, and many plates made by the gelatine-honey process. The chloro-bromide plates are much better than any others.

I have read with a great deal of interest some remarks published by Mr. Stillman a few months since on dry-plate work. In many points my experience corresponds very closely with his; and what I specially like in his investigations is the determination to get at the bottom of any matter in hand, if labour and endless experiments can accomplish it. Mr. Stillman remarks that, after all his experience in dry-plate work, he finds nothing equal to the wet for searching out faint lights in deep shadows. This inferiority of the dry processes is one which has rested on my mind for years—so much so that in all my comparative trials with dry plates, of which I have made a *very* large number, I include an object in intensely deep shadow beside one very brightly lighted, and carefully note the relative amount of detail in the shadow that can be obtained without carrying the development far enough to injure the high lights. My test object is a stove-house in full sunshine, including a piazza so deep that the wall beneath it does not receive a particle of light from the sky, but only some faint diffused light radiated from grass and gravel roads. The deficiencies of detail in the deep shadows were always vexatious with the coffee process, the tannin, &c., also with the honey-glycerine; but with the chloro-bromide plates and pyro. preservative I can get, by extending the time and developing carefully, a very satisfactory amount of detail in these dark places.

Even were I to admit (and I should hesitate to do it) that the chloro-bromide process is inferior to the wet in this respect, I am inclined to attribute to it some counterbalancing advantages. The high lights have very little tendency to become too dense; I might almost say they never do when tolerably well managed. If a plate has been very much over-exposed the high lights will print flat, but not snowy; there will be a want of detail, but not of opacity. Only in one case is one troubled with too opaque a result, and that is when a brightly-illuminated, sunny distance is combined with a foreground of shaded foliage —a combination which may trouble even an experienced wet-plate photographer.

Substratum of Albumen.—I notice that, from time to time, albumen is recommended as a substratum for dry plates. Several years ago I determined to test its applicability carefully, which was done in the following manner:—The albumen solution was applied over part of a plate in the form of a broad band about half-way between the middle and the edge, and was carried round the plate in this way, forming a sort of oblong frame, enclosing the central portion, and having a wide border outside it, the centre and the outside portion having nothing between them and the glass except, of course, at the edge, where an edging of solution of caoutchouc in benzole held the film to the glass. In this way the albumenised portion extended through all parts of the view, and afforded a very fair test. The result was that all those portions of the film under which was the albumen gave a poorer and weaker image. The trial was made, I think, on three plates simultaneously, and the evidence against albumen was so overwhelming that I have never repeated the trial. M. Carey Lea.

Philadelphia, March 12, 1874.

Neôleo-Peinture.—Rendering Paper Transparent.—Taking Large Portraits Direct.

Since the date of my last letter I have been shown all the paraphernalia of the new French process of painting photographs in oil colour at the back, alluded to by me in a recent letter, and can now give my readers as full information respecting it as can be obtained. The process is called "Neôleo-Peinture," and has been patented in France by MM. C. Herbert and O. Puttemans (not Pettit, as I before stated). Those who wish to learn the process must apply to the latter gentleman, at the following address :—No. 11, Rue St. Lazare, Paris. Specimens of different kinds will be sent by him on receipt of from five to ten francs; and the appliances for working the process can be obtained from M. Carette, 31, Rue d'Enghien, Paris.

The specimens which I was shown were mounted upon canvas when of large size, and upon small wooden panels when no larger than *cartes de visite*. They looked exactly like common oil paintings, and were very vigorous, neat, and smart; and, if not quite up to the standard of Etty or Vandyke, were at least as good as good coloured photographs commonly are—indeed, I may say better, as they ought to have been, the principle of applying the colour having been more correct.

The materials were contained in a nice, large, convenient wooden box, and consisted of certain bottles of varnish, each holding about a pint, together with a good assortment of oil colours in tubes, and brushes.

A print upon albumenised paper is first rendered transparent by brushing over it a special kind of oil or varnish, which is prepared for the purpose. It has a dark-red colour, and looks very like a mixture of boiled oil and turpentine. When this is dry the photograph is painted upon the back. It is then retouched upon the face, and is finally mounted upon canvas or panel with another preparation which looks very much like a thick solution of glue.

The photograph, when rendered transparent by the red varnish above alluded to, has a decided yellow tinge; but in other respects the method is tolerably successful. I should, however, recommend in preference my own solution (arrived at after a considerable number of experiments), which is composed of a mixture of colourless linseed oil and benzoline—first, because this imparts no yellow tinge to the paper; and, secondly, because the benzoline, being a more volatile spirit than turpentine and more penetrating, carries the oil with it more thoroughly into all the pores of the paper.

I can strongly recommend this process to the notice of photographic colourists and artists; for I believe it to be thoroughly right in principle, very simple in practice, and capable of yielding the most splendid results in the hands of a man of taste. To suppose that by *any* process a photographic portrait can be successfully coloured by a person *without* taste would, of course, be absurd. No one but a trained and clever artist can really succeed in colouring a photograph properly. It will, however, be a great aid to him when the process employed is one which does not hide the details, which is true of the process now under consideration.

I am glad to see that our Editors have taken up the subject of rendering paper transparent, and that my ideas are pretty much in accord with theirs as to the best means for this purpose, viz., colourless linseed oil in preference to a varnish.

French photographers are just now engaged in a lively discussion as to the cause of the yellow spots in prints; and one of them, Mademoiselle Rosine Mezzara, affirms positively that she has discovered it. She traces it to smoking tobacco or taking snuff whilst fixing or washing the prints. It appears that cinders from the fragrant weed, when in a state of combustion, fall from the pipe or cigar into the washing-water or solutions and produce these spots! M. Lacan has reminded us that the late M. Claudet held a similar opinion, and strongly objected to the presence of the seductive weed within the area devoted to photographic operations. The moral is—give up smoking and snuffing, and thereby save your health, your money, and your pictures.

I have been spending a few days lately with my friend M. Mévius, of Rennes, and we have tried many interesting experiments together. Amongst others, he took a large direct portrait of me, about half life-size, with a large Derogy lens having five inches aperture. In order to shorten the exposure a sheet of ground glass was held before the lens for a second or two as soon as the cap was removed; and, in order to sharpen the definition, a stop was introduced during one-half of the exposure. Twenty seconds were given, and the image came out well; none of the details of my black velvet coat were at all defective. The face alone would only have required about ten seconds, which bears out, I think, some remarks which I made in the last number in an article *On Taking Life-Size Heads Direct.*

Whilst with M. Mévius I had another look at the direct positive alluded to in my last letter. It is extremely thin—as much so as a common glass positive—nevertheless it has given, by enlargement to three times linear, an extremely vigorous negative.

If any of my readers should be crossing the Channel this year I strongly advise them to try the following remedy for sea-sickness, which they will find far better than Lord Byron's famous beefsteak—viz., a bottle of champagne, shared with a fellow-passenger. Of course I do not mean the sophisticated tartaric juice of the grape manufactured according to the formula of the renowned Moet, but the pure, unadulterated vintage of Berkshire—the delicious juice of the ripe English gooseberry, at half-a-crown a bottle, which is the next best beverage in the world to good English ale. Try it, dear reader, and you will not be deceived. Such, at least, has been my recent experience on crossing the other day to the old country from St. Malo in the jaws of a stiff nor'wester.

And whilst on the subject of wine—or stuff called by that name in England—let me mention a test for your claret. Add a little iron developer to it, and if it turn black from the presence of logwood use it for the inside of your camera rather than for the inside of your stomach. THOMAS SUTTON, B.A.

Stoak Vicarage, near Chester,
March 26, 1874.

THE CONSTITUTION OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.

To the EDITORS.

GENTLEMEN,—It would, I venture to think, interest your readers if your indefatigable correspondent, Mr. Sutton, would favour us with some further particulars as to the constitution and working of the Photographic Society of France. Will he kindly explain to us who and what are "titular members," who seem, if I understand his statement correctly, to be the Society proper, the other two classes—the "corresponding members" and "associates"—being mere adjuncts without power or authority? Of what class are these "titulars" composed? Are there any amateurs amongst them? Why, too, is either class, however it may be composed, limited in number? What are the "associates," and what their privileges? What subscription is paid in each class? I do not doubt it is all clear and reasonable enough, if one did but know what it all means; we might, perhaps, get some hints for the management and constitution of photographic societies on this side of the water. Does the system work well? and what are its advantages or drawbacks, if there be any?

To judge from the reports of its meetings strange things happen there, as in other places. For instance: at the last meeting (as reported) M. Hermagis showed a new lens made of *flint glass*, in which the *novelty* claimed for it (as reported) is that "red lead" forms part of its composition. As well might he have described a new *sausage* dumpling of which *sausage* formed part of its composition. It, also, being upwards of three inches in diameter (eighty-three centimetres), would actually cover a *carte-de-visite* plate! Surely the "titulars" must have known better than to put forward a lens on such grounds. I daresay it is all explainable, but at present a photographic fog hangs over it.—I am, yours, &c., P. LE NEVE FOSTER.

Society of Arts, John-street, Adelphi,
March 30, 1874.

THE SECRET ENAMEL PROCESS.

To the EDITORS.

GENTLEMEN,—A paragraph in your last issue respecting the enamel process calls for some notice from us, and we think in common fairness you will not deny us the right to answer the charges you bring against us.

It has been well said that "a lie which is half a truth is always the blackest of lies" and the most difficult to meet; but, in the case of yourselves and Mr. Watson on the one side, and ourselves on the other, we have no difficulty in making a very clear and straightforward answer, although you have prejudged the case, having only heard one side. We do not envy you the apparent avidity with which you have snatched at what appears to you to be a great scandal connected with our names. But it is no part of our purpose to answer any interpretation you put upon the matter; our only object at present is to answer Mr. Watson.

The plain facts of the case are these:—A few years ago we bought Mr. Watson's process unencumbered with any restrictions whatever as to its use; we gave him three guineas for it, and were rather surprised to find that all the main principles of the process had been already printed in your own pages. We made many thousands of experiments in this process, by which we introduced improvements that were not even hinted at by Mr. Watson, rendering the results much more beautiful, and the working so entirely certain that it became a great commercial success.

Having some inquiries from America for our process (which arose from the beauty of some specimens we had sent to the exhibition of the N.P.A.) we offered the process for sale, at the same time writing to Mr. Watson acquainting him of the fact, and saying that if the sale came off we would give him a fair share in the proceeds. Then came a letter from America saying that it would be much better to secure a patent, and then we wrote the *private* letter to Mr. Watson (which, according to the usages which obtain among gentlemen, should not have been published) from which you have given extracts, and which, if you had printed the letter as a whole, or given the extracts fairly, would be seen to be an offer to Mr. Watson to join him in an American patent and to go shares in the proceeds, he taking one-third and we two-thirds of the gross receipts, we paying all expenses out of our two-thirds. This Mr. Watson declined to do unless we would pay him a large sum down. As we could not come to any terms with Mr. Watson in the matter, we wrote over to America to stop any further proceeding being taken about the patent.

Our agent in America now tries to sell *our process*—which is avowedly a great improvement on Mr. Watson's—in America as a secret process; and if you think there is any harm in this you are, of course, competent to hold and express your opinions.

We gather from your paragraph that Mr. Watson has carried out a patent for his process in America. We are glad. All we ask is—let the Americans go and see our specimens and his, and let them choose which process they will buy. We do not mind saying this now that Mr. Watson has taken up arms against us. We should have been very sorry to run counter to his interest either here or in America had he not showed such an utter disregard for all we have tried to do for him. We have recommended his process both in private and in print. We endeavoured to get him to join us in a patent by which, had he acceded to our proposals, he would have reaped a large pecuniary benefit. We assisted him in a personal matter, in which we used our influence to stop proceedings at law, and he assured us that our assistance was of the greatest service to him. And, in short, we have done all we could do for him, as we have always been ready to do for any other photographer in difficulties; but we have found that we could not deal with a man who is so utterly impracticable, we having found him to be one of those men for whom it is impossible to do any kindness, or to assist in any way, without exciting their suspicions that they are going to be injured.—We are, yours, &c.,

H. P. ROBINSON AND N. K. CHERRILL.

Tunbridge Wells, March
28, 1864.

[We have, of course, not the least objection to print the letter of Messrs. Robinson and Cherrill. Into the matters personal between Mr. Watson and them we do not care to enter; but, so far as the *process* is concerned, it appears to us that Messrs. Robinson and Cherrill bear out our remarks to the fullest extent. We know nothing whatever as to the origin of the American adventure; but if it arose from the high quality of the specimens exhibited by them there, they must have been singularly different from those exhibited by the same firm in London. But, passing that over, if the process was not Mr. Watson's to begin with, and if they improved it to such a degree that they could fairly claim to sell it as a secret process in America, why did his refusal to join them prevent the patent from being carried out in their own name? His impracticability could have been no sufficient reason. It is singular, too, that the American patent agent should have "boiled down" Messrs. Robinson and Cherrill's instructions to merely what we might call a "Watson residue," if the alterations they had made virtually converted the process into a new one. Most of all are we puzzled to account for the reappearance of these gentlemen as vendors of a *secret* process after the failure of the patent notion. We have been wont to hear of their generosity in never keeping anything back from their brethren; but here we find them first trying to obtain a patent from what they admit was but partially theirs, and then, failing in that, endeavouring to follow the dodge which photographic adventurers have brought into utter disrepute. Messrs. Robinson and Cherrill's letter offers no explanation upon this point. These gentlemen wish that we had, for their vindication, printed *in extenso* the letter from which we made extracts last week, and, lest any one should suspect us of a bias in the matter, we now mend the omission; but we fancy that our readers will have the same difficulty as ourselves in finding out how Mr. Watson was to receive one-third of the gross proceeds when the "keen American" first gets one-half. The sum which Mr. Watson asked before joining in the patent was the fifty pounds here said to be promised him on the completion of the sale. The following is the letter in question:—

"*June* 30, 1873.

"Dear Sir,—It will be in your recollection that we told you some time ago that we were endeavouring to sell our knowledge of the enamel process to a gentleman abroad, and that, in the event of the sale being completed, we promised to send you fifty pounds; that is, supposing we got the sum you (we?) hoped to obtain.

"The party to whom we have been anxious to sell is an American; and, as you know Americans are keen men of business, so our friend has gone about to secure the game to himself by taking out a patent for the process for America.

"This patent he finds he *cannot execute himself*, as the patent law of the United States requires the documents to be signed and sworn before a notary by the inventor or inventors of the process. He has, therefore, sent the documents over to us for signature. Now we feel that, though we were perfectly justified in selling our knowledge of the art, we are not justified in swearing that we were the sole inventors of the process, especially as the patent agent in the United States has, in drawing out his specification, reduced our elaborate instructions to such a very elementary form as to leave in reality nothing but your principles very much as you gave them in your two-guinea circular.

"Under these circumstances we think that the following offer will meet the justice of the case, and that it will also be found favourable to your interests. We propose that you should sign the documents conjointly with us, and we will insert your name in every place where ours has been put as inventors, as—'And also W—— T—— Watson, of Hull, in the county of ——'

"In consideration of your name appearing in the patent—the patent being made, in fact, in our joint names—we will agree to hand over to you one-third of all that we receive for the process.

"We should tell you that our American friend, being, as we say, a keen man of business, has levied black mail on the process to the extent of one-half the gross receipts. Still, even after this heavy reduction, we doubt not that the receipts which come to England will be something pretty considerable, though, of course, we cannot in the least say how much it would be.—Yours, very truly, Robinson and Cherrill."

Those of our readers who care to look at the extracts we gave from this letter last week and to compare them with the entire document here given will not, we feel sure, join in the opinion that we wished to do Messrs. Robinson and Cherrill any unkindness when we withheld it.—Eds.]

ANSWERS TO CORRESPONDENTS.

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

Exchanges.—In our next.

Henry Hallier.—Received. Thanks. In our next.

Lancashire Photo.—The address required is "Great Queen Street, London, W.C."

H. M.—We have examined the hydrometer and find that it is not intended for silver at all, but for a totally different purpose. No wonder, therefore, that you failed in testing the strength of the silver bath by its means.

Amateur (Kerry).—It is much better to intensify in the dark room than in daylight. If the negative be previously fixed this is of less consequence. The prints you enclosed are nearly as good as could be obtained from the negatives even by an experienced printer.

J. M. (Edinburgh).—We are unable to indicate the quality of the lens from the *data* of which you put us in possession; nor are we so well acquainted with the trade mark as to recognise from it the work of any particular maker. We can only give an opinion after seeing the lens itself.

James T. Carter.—The symptons described indicate both an over-iodised collodion and a weak bath. If upon testing the bath it be found of a proper strength then mix with your iodised sample a certain proportion of plain collodion. This should remedy the evil, unless you are using an exceedingly "horny" pyroxyline.

A Java Sparrow.—It is probable that a dealer in second-hand apparatus would not hesitate to supply on hire such a camera as that you require. This you can ascertain on personal application. Should you fail let us know. Very rapid dry plates are now articles of commerce, as you will see by consulting our advertising columns.

Silvy's Studio.—In reply to several querists who have written asking for a detailed account of M. Silvy's studio, to which reference was recently made in this Journal, we have to state that under the heading, *A Model Glass House*, a full description of this studio, accompanied by a diagram, will be found in vol. xiii., page 219 (May 11, 1866), of The British Journal of Photography.

Nemo.—1. The copyright in all the engravings named has lapsed; hence you may reproduce them in any manner and to any extent you think proper. —2. A strong front light is necessary for producing a good copy of either an engraving or a photograph. This prevents the texture of the paper from appearing. But this end is best attained by putting the picture in optical contact with a plate of colourless glass. Try the effect by putting a few drops of water upon paper, and then pressing it against a piece of glass. You will see what a degree of diminution of texture is effected at the places that are wet.

Photolitho.—To clear the blacks of the negative, dissolve iodine in a solution of cyanide of potassium and apply to the film. If the solution be too strong it will dissolve the picture entirely. This ought only to be used for negatives of engravings, because any subject having true gradation would be rendered too harsh by such treatment. After the shadows have been rendered quite clear you may then intensify the picture to any desired extent, either by treatment with bichloride of mercury and sulphide of ammonium, by pyrogallic acid and silver, or by any other of the intensifying agents known to photographers.

T. Forrest.—Mr. Forrest, of Pont-y-pridd, sends us a plate-holder which, as he rightly says, is a very simple and good one. It is composed of a piece of wire bent like a bow, having at each end a small eye formed by bending the wire, and capable of receiving the corner of a plate, which is thus clipped at opposite corners. In forming this holder more wire is used than is really required for the bow, and this is twisted into a loop so as to form a handle, by which the plate-holder is conveniently handled. We may state that silver wire plate-holders of a similar kind, but having an ivory handle, have been much used in Paris for some years back for small plates; Geymet and Alker, among others, use it for their Jumelle camera.

George S. Farnham.—The iodised albumen recommended by Mr. Mudd for the collodio-albumen process is composed as follows:—

Iodide of potassium	50 grains.
Bromide ,,	10 ,,
Liquor ammonia	100 minims.
Water	2½ ounces.
Whites of	10 eggs.

The iodide and bromide are first dissolved in the water, then the ammonia is added, and the solution is then beaten up with the eggs into a froth.

Received.—*The Great Pyramid and the Royal Society (London)*. By Piazzi Smyth, late F.R.S. From this pamphlet, which extends to twenty-four pages, we find that, in consequence of certain proceedings, the talented author has seen it to be his duty to retire from the Royal Society. His resignation is couched in the following terms:—"Having thus failed in all that I can do to open the eyes of the Society as to whether they are seeking 'accurate measuring, truth-stating, and justice-doing,' or the exact opposite thereof, in researches concerning the most ancient and exalted monument of intellectual and religious man on the face of the earth, there is nothing now left me but to come out of the Royal Society, as I do hereby, resigning my Fellowship therein." The Astronomer-Royal for Scotland will not be a whit the less respected because he has thus voluntarily removed from his name the once highly-prized three initial letters, and has deprived himself of the advantages supposed to be attached to Fellowship of the Royal Society.

Indecent Photographs.—The police on Monday seized 100,000 indecent photographs on the premises at 20, Bloomfield-terrace, Pimlico. Some of the more objectionable portraits were recognisable as those of the owner of the house, his wife, and two sons. At Builder's-yard, Pimlico, the police subsequently seized 5,000 photographic negatives of an indecent nature.

Developing Gelatino-Bromide Plates.—Mr. Kennett has supplied us with the following directions for developing gelatino-bromide plates, premising that, in respect of exposure, if the plates are used in the moist state they must receive the same exposure as wet collodion plates, while if dry about one-half longer will be required. The *developer*:—

No. 1. To 30 grains of pyrogallic acid add 8 ozs. of water.
No. 2. To ¼ an ounce of strong ammonia add ,, ,,
No. 3. To 3 drms. bromide of potassium add ,, ,,

After exposure put the plate into a dish of water for five minutes or longer. As there is sometimes a tendency for the developer to recede from the edges of the plate, it is advisable before commencing the development to pour on a little plain gelatine solution, strength about one grain to the ounce of water; and as these films will stand any amount of rough usage, you can guide the solution round the edges with a tuft of cotton or even the finger. Pour back any surplus into the bottle, and commence the development by adding to one ounce of No. 1 one drachm each of Nos. 2 and 3, and pour on the plate; in a few seconds the image will appear. Continue the development until sufficient density is obtained, or, if any difficulty occur in getting sufficient density, wash off, and do not be afraid of using the water; then flood the plate with a weak solution of acetic acid and water and intensify with the following:—pyrogallic acid three grains, water one ounce, with fifteen drops of glacial acetic acid, to which add one or two drops of a twenty-grain solution of silver; density to any amount will now be readily obtained. On no account let either the developer or intensifier remain on the plate after it has become discoloured, or a stained film will be the result. When the required density is got, wash thoroughly, and fix with hyposulphite of soda, strength three ounces to a pint of water; wash and let dry spontaneously. Should either the developer or intensifier quickly discolour, add a little more bromide to the first and a little more acid to the last.

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THE BRITISH
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THE LONDON PHOTOGRAPHIC SOCIETY AGAIN.

Nothing could apparently be more satisfactory than the supposed settlement of the difficulties under which the members of this Society and its executive have for some time laboured. It will be borne in mind that the annual meeting in February was a memorable one, as, in consequence of an adverse vote which the Council construed into one of a want of confidence, they in a fit of petulance not only threw up their offices, but the majority of them retired from the meeting before concluding the business proceedings. We abstained at the time from commenting on this act of bad taste as well as of disrespect to the Society, having no wish to further increase the then prevalent excitement. Had these resignations taken place on any occasion but at the annual meeting the result would have been the complete dissolution of the Society, as no executive would have then remained in existence to carry on its affairs.

We have no means of knowing whether this contingency was deliberately planned or was a mere accident. We, however, generously conceive that this body did not see the full consequences of their act, and that therefore they did not intend, *because* a vote had been passed which they did not approve of, to cause the dissolution of the Society. We may be in error in this assumption, but we prefer to give them the benefit of the doubt. There are some gentlemen among the recent recalcitrant portion of the Council whom, we believe, are above so despotic an act. The accident, however, did occur that the further business of the evening was the election of six members of Council to fill the annual vacancies, and as five members of the Council constitute a quorum for business purposes the elements of an executive existed within them. The Council had nominated six gentlemen to fill these places, and, for the first time in the Society's existence, six opposition members were also nominated. The latter six were elected.

Another portion of the evening's business on the programme was the election of a committee to revise the laws. Several members of the late Council were proposed, but they declined to serve; others of the same body were elected, but they also refused the office. A committee was, however, appointed, and the meeting was adjourned to enable this committee to bring up a report on a system of revised laws. At the March meeting an elaborate report was submitted, embracing a more comprehensive and liberal code of rules than the Society had ever yet possessed.

At the same meeting another portion of the business was the election of officers in lieu of those who, at the previous meeting, had so unceremoniously resigned. On this occasion the spirit of conciliation prevailed, and no better proof could be given than the almost unanimous re-election of the members who had resigned to their old posts. This accomplished, the other six members of Council—whom, for distinction's sake, we shall call the "reformers' section"—then also tendered their resignation, and they were again elected, the Vice-President, Mr. Spiller, to his credit be it spoken, being the seconder of the resolution, and who also stated his personal willingness, under the resumed amicable relations, to return to office.

Nothing could have been better had this arrangement been carried out; but here comes a curious sequel. The old members of the Council have since intimated their return to office, to use their own words, "*as the Council.*" They have, therefore, resumed the reins of government, and, with astounding coolness, ignoring their fellow-members, the reforming six, have held a meeting or meetings at which they have not requested the attendance of the latter! Seeing that both sections were elected at the same meeting, and under the same circumstances, we cannot understand what justification can be offered for this offensive conduct to their colleagues, or for their marked disrespect to the Society by whose votes they were elected. This is the more remarkable as the resolution for the re-election of what we have called for distinction's sake the "reformers' section" was seconded by one of the now Vice-Presidents, Mr. Spiller. We can hardly realise the position in which this gentleman stands, and we look with interest for his explanation.

The whole proceeding is in utter violation of the understanding at which the members present had arrived at the March meeting. It was then explained, again and again, that the re-election of the old members of the Council in nowise invalidated or ignored that of the six new members. There were many of the old members of the Council present, and who were, therefore, aware of the proceedings, and yet uttered no protest. How they can, therefore, ignore the election of the six new members passes our comprehension. The obvious conclusion—and one that we reluctantly adopt until we have heard such explanation as can be offered—is that they have voluntarily chosen to set aside the deliberate decision of the members, and that they have elected themselves again to be the sole arbiters of the Society. If this be the natural conclusion—and we can see no other—then the worst charges that have been made against them are not so bad as this despotic act. They have often been alluded to as influenced by *camaraderie*—as being a *clique*; but no one has had the hardihood to charge them with disregarding the will of their fellow-members in so marked a manner as is indicated by their present action.

This is not the only instance they have chosen to show their arbitrary disposition. In the face of the fact that a committee has been appointed to revise the laws—a committee on which some of these gentlemen were invited to serve and were elected, and which committee has not been dissolved, but whose report stands for consideration—they, with characteristic indifference to what has been done, coolly propose that on next Tuesday evening "a committee will be appointed to revise the laws."

It is not for us to say what should be done under the circumstances; it is for the members assembled to say whether they will accept the changed conditions so hostile to what was concluded at the last meeting. The responsibility rests with those who, having honourable means of extricating the Society from all its troubles, choose rather to adopt an arbitrary course, which can only cause increased irritation, and may possibly jeopardise the existence even of the Society.

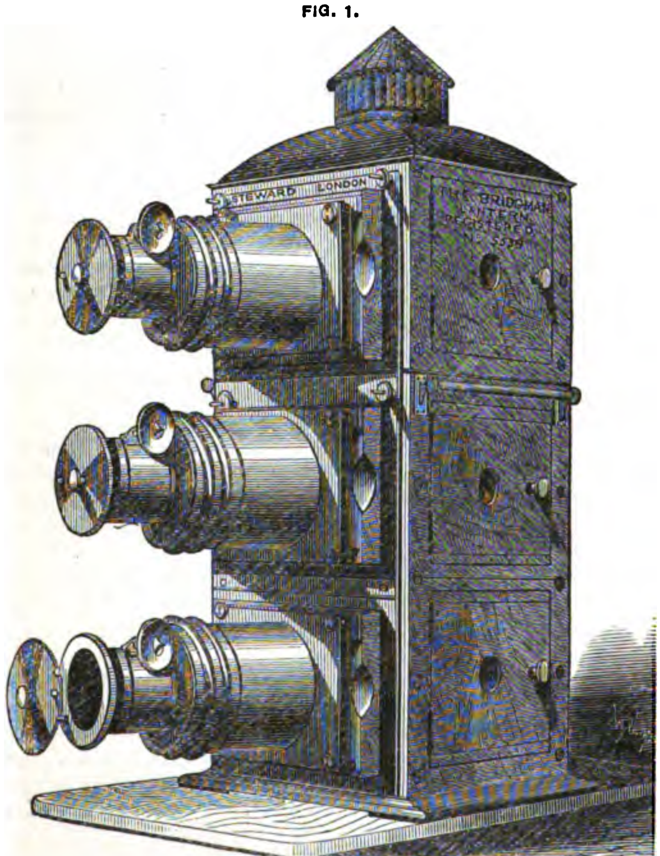
AN IMPROVED TRIUNIAL LANTERN.

The magic lantern may now be considered as a photographic instrument; and journals devoted to photography appear to be accepted as the proper organs in which to discuss the principles and application of lighting and optics as applied to an instrument so well adapted for exhibiting, on an extended scale, the works of the photographer. By the advent of photography the lantern has become entirely revolutionised; for, from having been the medium through which to exhibit grotesque pictures for amusement, it has, through photography, been elevated to the rank of a most useful and potent auxiliary to lecturers on a large range of subjects. Physiology, geography, geology, architecture, archæology, anthropology, and, indeed, every branch of science, are all now brought before the public by means of the joint efforts of the camera and the lantern; for lecturers have long since discovered that pictorial subjects presented to the eye are more vivid, fascinating, and abiding than the most eloquent word pictures falling upon the ear. The lantern, therefore, deservedly occupies a high and important place as an educational power.

Between the magic lantern as it proceeded from the hands of its inventor, Father Kircher, in the latter half of the sixteenth century, and the best form of the instrument as at present constructed there is a marvellous difference, and it seems probable that these changes will increase with the improvements introduced in the future into the construction of this valuable instrument.

In the course of the last few days we have examined a new apparatus, known as the "Bridgman lantern—registered," manufactured by Mr. J. H. Steward—a name quite familiar to our readers for several years past in connection with the meteorological table published in each number of this Journal. Mr. Steward, on the suggestion of Mr. Bridgman Smith, a well-known London "exhibitor," has constructed a lantern on the biunial model, but with this difference—that there are three optical systems instead of two. It is really a triunial lantern, as will be seen from the engraving, *fig*. 1, in which is shown a front and side view.

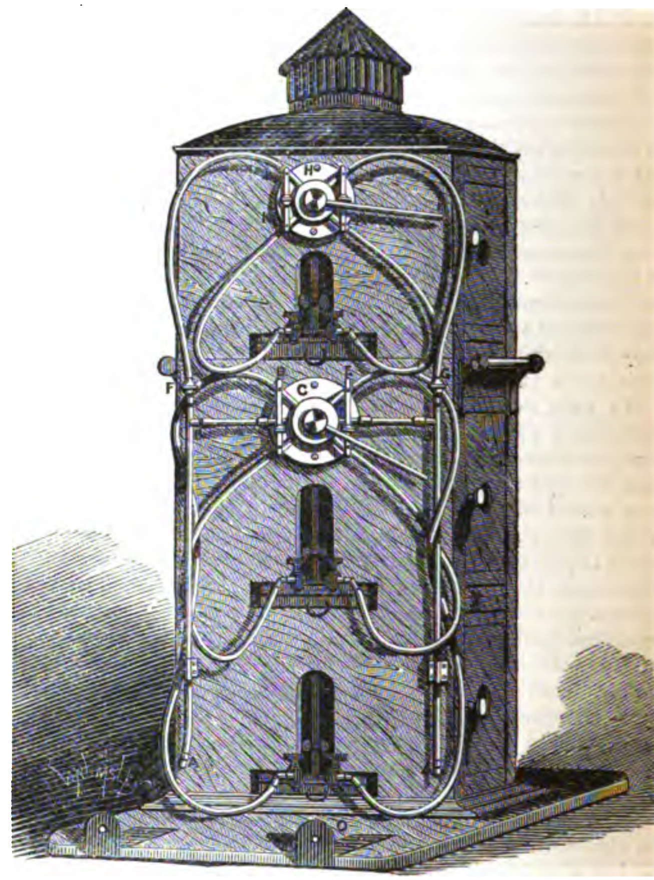
FIG. 1.



There are certain peculiarities about this which we shall describe. In the first place, the body—similar to that of the best lanterns—is made of mahogany, lined inside with thin iron. There are three doors on each side, so as to admit of the light being adjusted from either side. The upper lantern is attached to the lower portion of the body, so as to be capable of being entirely removed and attached to an independent base-board, in which state it is a lantern complete in itself, leaving the rest of the body a complete biunial lantern, an extra top being provided for that purpose.

The jacket into which the focussing tube of the lens is screwed is threefold, being telescopic and capable of extending from three to twelve inches, and so well is the brasswork made that there is the most perfect rigidity in every part. The lenses, which are achromatic, are also so arranged as to be divided; hence, while a disc of any desired dimensions may be filled when the lantern is at the distance of a few feet from the screen, the same may be done when the exhibitor has to operate from a position at the back of a hall or church, and project his picture over the heads of the people—a power which every exhibitor will appreciate.

FIG. 2.



The light is oxyhydrogen; and the burners are arranged to burn the gases in a mixed state. In *fig*. 2 we present a back view of the lantern, showing the whole gas and dissolving system. When the upper lantern is to be used alone the tubes are disconnected at F and G.

M. MARCHAND'S PROCESS FOR THE MEASUREMENT OF THE CHEMICAL ACTION OF SOLAR LIGHT.

A few numbers ago we referred to the experiments upon this important subject, and pointed out that this gentleman's process, as far as the actual working goes, did not possess any originality whatever. Our remarks were then based upon an abstract which had appeared in the *Journal of the Chemical Society* for June. We have since exhumed the paper, and find that it appeared in Paris so far back as June last. On reading over the paper in the original we are only confirmed in the opinions then hazarded—that it is merely the process of Dr. Draper of New York, as modified by Mr. Draper of Dublin.

Outside the actual process, however, we must say that there are several points of interest and importance to the photographic world.

How interesting it would be if local observations could be taken in all parts of the world, at all seasons of the year, and thus that the recorded statistics were always ready to the photographer's hand! Any investigations tending towards this consummation by facilitating the process are of value; and any information bearing upon this question generally must ultimately prove useful to the practical photographer.

M. Marchand's process consists in weighing the carbonic anhydride (carbonic acid) evolved from an acid solution of oxalate of iron. He makes his solution by introducing equivalent proportions of the salt, perchloride of iron, and oxalic acid. We have, therefore, a mixture which, we presume, would give the following reaction when submitted to the sun's rays:—

$$\underset{\text{Ferric chloride.}}{Fe_2Cl_6} + \underset{\text{Oxalic acid.}}{H_2C_2O_4}, 2\,HO = \underset{\text{2 eq. ferrous chloride.}}{2\,(Fe\,Cl_2)} + \underset{\text{2 eq. hydro-chloric acid.}}{2\,(HCl)} + \underset{\text{2 eq. carbonic anhydride.}}{2\,(CO_2)} + \underset{\text{Water.}}{2H_2}$$

The author says that the reaction proceeds with great regularity if the proportions are properly adjusted; and that the carbonic anhydride—which, it will be seen by the above equation, is eliminated—is always proportional to the energy expended *(à la somme d' énergie dépensée)*.

From the experiments of M. Marchand, the above fluid seems to be particularly sensitive to that part of the spectrum comprised between the lines F and G—that is to say, the part of the spectrum which gives blue light. These rays act much more energetically upon it than the violet rays, and therefore would, in this respect, more nearly resemble chloride of silver than the iodide or bromide.

One of the details in which M. Marchand differs from previous experimentalists is that as the chemical action is measured by the carbonic anhydride produced, and as that substance is a gas soluble in water, it is necessary to devise some method by which the gaseous product should not be retained by the water in which the oxalate of iron is dissolved. Whereas Mr. Draper displaced that gas by passing a stream of hydrogen, M. Marchand uses glycerine for the object of not absorbing the gas; but this is not very clearly explained, although it is stated to be insoluble in that substance. "*On peut recueiller ce gaz*" (the carbonic anhydride evolved) "*sur de la glycérine qui ne le dissout pas*," &c.

The chemical energy of the sun, according to M. Marchand, is always in direct relation with the height of the sun above the horizon; but the actual theoretical calculation of the chemical energy in any given latitude or longitude, and at any given time, cannot be theoretically determined, because of the want of transparency of the atmosphere itself, which interferes with the progress of the reaction. This fact is what renders local and statistical determinations of value. Thus at Fecamp, where the experiments were performed by M. Marchand, the *actual* chemical energy was reduced one-half by want of transparency in the sky.

From the experiments performed by the author at Fecamp, under a cloudless sky, he has calculated the chemical energy. According to these experimental determinations he also calculates the other latitudes; thus at the summer solstice the total energy for square metre is as follows:—

	Total energy per square metre expended in the twenty-four hours.
Equator	498°.
Twenty-fifth parallel of latitude	657°.
Pole	479°.
Equinox	345°.

In explanation of this table we may mention that the metre is the basis of the French metrical system. It is supposed to be the ten-millionth part of a quarter of the meridian of the earth, and equals 1 yard 3·7 inches of our measure.

The figures in the above table not only show the relative intensity of the light, but are supposed to represent actual arbitrary measurements of the force expended. They are termed calometric degrees. A calometric degree is founded upon the direct results obtained by burning in oxygen various substances. The arbitrary "heat unit" adopted is generally that proposed by Dulong, namely, the quantity of heat required to raise one gramme of water (about fifteen and a-half grains) one degree of the centigrade thermometer. One cubic centimetre of carbonic anhydride by the action of light is, according to M. Marchand, equal to ·001856 of a calometric degree. If we wish to appreciate the chemical force which is spread out upon the surface of the globe by the sun's rays during each minute suffice it to say that it would transform into carbonic acid 39,835,900 tons of carbon; and, in spite of this large figure, the carbon consumed in twelve months, if it possessed the density of anthracite would only give a uniform bed upon the surface of the earth of about twenty-three millimetres thick (nine-tenths of an inch).

The researches of M. Marchand are too important to photographic science for us to pass them over in silence; but what we want is a ready method of estimating the actinic force, and one which could be used by the working photographer. In a future article we think we can show how the process above described can be simplified.

PHOTOGRAPHS AT THE INTERNATIONAL EXHIBITION.

[First Notice.]

Photographers seem to have become impressed with the idea that old works are quite as good as new to present to the visitors of this Exhibition. Certainly there are numerous pictures there displayed which will be recognised as having "done duty" both at the last photographic exhibition at Pall Mall and elsewhere; indeed, the fact is indicated on some of them.

We have as yet no means of ascertaining what photographs are to be exhibited in the French department, as it has not yet been opened; meanwhile, we may state that prominent among the English exhibitors here, as he was at the Photographic Society's exhibition, is Colonel Stuart Wortley, several of whose works immediately arrest the eye upon entering the gallery or corridor in which the photographs are this year displayed. From the catalogue we find that several of Colonel Wortley's large portraits—such as *Petsie*, *Dolly*, *My Lady's Page*, *Mademoiselle*, and others—have five guineas registered as the price at which these works are each to be sold. Such, also, is the price at which Messrs. Robinson and Cherrill's picture, *Preparing Spring Flowers for the Market*, is to be disposed of, some other works of these artists being priced at half the above amount.

Mr. Crawshay exhibits several portraits executed in his own particular style, those of *Justice Grove* and *Dr. Diamond* being included in his exhibit.

Signor Lombardi contributes several portraits, together with numerous views of the *Brighton Aquarium*. Numerous works of imposing appearance are exhibited by the Berlin Photographic Company, while Mr. William Bedford contributes several of those fine landscapes of which we had occasion to speak so favourably in connection with a former exhibition.

Messrs. Lock and Whitfield, Blanchard, Bergamasco, F. M. Sutcliffe, and Frederick Bruckmann are all represented; while A. Boucher, M. Whiting, George Bruce, Lewis, Ferneley, Beer, and Hedges also contribute examples of their pictorial works.

Mr. Earl exhibits pictures of dead birds, the price of which (fifteen shillings) will be paid ungrudgingly by those who require such excellent specimens of still life.

The photographic representation of children is always safe in the hands of Mr. Faulkner, who exhibits largely of this class of photographic work; other competitors, however, have entered this field with Mr. Faulkner, among whom are Miss Emma Cooper and Miss Eliza Morris Mason. Among other representatiyes of the gentler sex who exhibit will be found the names of the Misses Davison, Mrs. Boulger, and Mrs. Isabel Cowper.

In addition to the artists above mentioned there are several other exhibitors, and in our next issue we shall offer a few critical remarks on, or give a brief description of, the principal works exhibited; for, on Monday last, the opening day of the Exhibition, the immense crowd present and consequent confusion prevailing rendered it impossible to bestow more than a passing glance at the photographs, which, we may state, are exhibited in a narrow gallery in the Albert Hall, immediately adjoining Spiers and Pond's refreshment room, on the left as visitors enter the Hall from the Exhibition.

To Mr. William England has been entrusted the privilege of photographing the objects in the present International Exhibition.

ALBUMEN WITH CHLORO-BROMIDE EMULSION.

I am much disposed to think that the future of the emulsion process depends upon albumen. I described recently some experiments made in this direction more than four years since, and I now propose to speak of some made in July last, very shortly after my return to America. To explain my views more clearly I must just say a few words on the action of preservatives in general.

Some years ago I expressed in the columns of this Journal the opinion that there is no "best preservative;" that, with one sort of pyroxyline and with one condition of the emulsion, one preservative would give the best effect, with other conditions another. And I also mentioned that the quantity of excess of silver nitrate which would give the best result was by no means a fixed one, but depended entirely on the preservative.

For example: I used for a long time the cochineal preservative, for which I published the formula some years ago. In testing a vast variety of preservatives I found that, with a moderate excess of silver nitrate, this preservative gave the highest sensitiveness of all.

It was not till some time after I found that, by using *pyrogallic acid* as a preservative and increasing the excess of silver nitrate by two or three grains, I got plates as sensitive as those given by cochineal, and cleaner, brighter, and denser. This result could not be obtained by increasing the dose of silver with the cochineal; the result was flatness and want of character.

Later still I found that *gallic acid* stood in much the same relation to pyrogallic as the latter to cochineal. Used with the dose of silver nitrate that gave the best results with pyrogallic acid, gallic acid gave distinctly inferior results; but, by increasing the silver, the sensitiveness was raised to the same point as with pyrogallic acid, with possibly a slight gain of brilliancy. And I think it is highly probable, though I have not tried it, that *tannin* constitutes still another step in the same direction, and that with a still larger dose of silver nitrate we should obtain an equal sensibility. So that we have a regular series of preservatives. Each used with the dose of silver nitrate proper to the next member below of the series shows inferior sensitiveness; but, when treated with the quantity of silver proper to itself, gives excellent results. It cost a very large number of experiments to fix this principle, and I think I may say that it throws a great deal of light upon the functions of dry-plate preservatives.

Albumen we know to have certain very precious qualities in connection with dry plates. It gives a great fineness of image, and very beautiful distances; but, on the other hand, plates prepared with it have been found comparatively slow and insensitive.

But if, as I have endeavoured to show, it is a principle that the want of sensitiveness of a preservative may be compensated for or be removed by increasing the proportion of excess of silver nitrate at the same time that its good properties may be retained, then it seemed to me likely that albumen only needed enough silver nitrate in the emulsion. I made this trial in July last, and the result fully confirmed my expectations. I obtained albumen plates with a sensitiveness as high as those prepared with pyrogallic acid. The following is the formula I used:—

Gum and sugar solution	2	ounces.
Gallic acid, 60-grains' alcoholic solution	½	ounce.
Prepared albumen	½	"
Water	5	ounces.

The *gum and sugar solution* is obtained by dissolving seven ounces of good clean gum arabic and two ounces of white sugar (avoirdupois ounces in both cases) in fifty ounces of water, adding a drachm of carbolic acid to make it keep. The gum should be washed off with water before dissolving it.

Prepared Albumen.—Shake up three fluid ounces of white of egg with an equal bulk of water, and add seventy-five minims of acetic acid No. 8 (corresponds with Beaufoy's acid), and filter.

Those who may not wish to prepare a quantity of gum solution can substitute—

Water	7	ounces.
Gum arabic	140	grains.
Sugar	40	"
Gallic acid, 60-grains' solution	½	ounce.
Prepared albumen	½	"

The collodion consists of—

Cadmium bromide	7½	grains,
Ammonium bromide	1½	grain,
Pyroxyline	7	grains,

to the ounce of alcohol and ether, equal parts of each—or, rather, five of ether to three of alcohol, to allow for the subsequent introduction of alcohol with the dissolved silver nitrate.

To each ounce of collodion is to be added two drops of *aqua regia* and twenty grains of silver nitrate. This very large excess of silver, which would ruin a plate prepared with a highly-sensitive preservative such as cochineal, has an excellent effect with albumen; in fact, with a collodion so prepared, a substance like albumen is absolutely needed as a preservative, in order that good effects may be got. The collodion should be a month old, at least. I generally keep the emulsion twelve hours before using, though a somewhat less time is allowable.

The plates yielded by the albumen formula were carefully compared with companion plates prepared without albumen, *and exhibited a distinctly greater degree of sensitiveness.*

I think I may say, therefore, that this problem of a highly-sensitive albumen plate is solved. I have now commenced a series of experiments to try whether the foregoing formula can be improved upon.

M. Carey Lea.

ON PRINTING TRANSPARENCIES UPON MOIST PLATES.

In printing transparencies upon moist plates, in a copying camera, a remarkably beautiful series of colours may be produced, lying between a warm brown and a deep blue-black. In order to show what these colours appear to depend upon, I will first remind the reader of the process by which bromo-iodised moist plates are prepared for negatives, and will then point out the modification to be introduced in order to obtain fine colours in glass transparencies.

The negative process which I have employed is briefly this:—The collodion must contain at least three grains of bromide of cadmium per ounce in addition to the usual quantity of iodide. The plate must be excited in a nitrate bath of the usual strength, after which the plate should be washed so as to remove all trace of free nitrate, but not all trace of unconverted soluble bromide, some of which must remain. For this purpose three or four changes of the washing water during five minutes' immersion in a dish will suffice. A wash with salt and water, and then a rinse with plain water, makes the process doubly sure. The plate is now to be coated with an organifier composed of albumen one part, glycerine one part, water two parts, then wiped on the back, drained, and put into the dark slide ready for exposure. Plates thus prepared will keep for several days, but I cannot say how long—not improbably a month. The film never becomes dry, but always remains slightly tacky, never loses its opacity as a dry film does, and never requires a preliminary coating to prevent blistering, wrinkling, &c. The development may be very simply effected by means of pyrogallol with acetic acid and silver.

Such is the negative process; and I wish most particularly to observe respecting it that since no free nitrate remains in the film the iodide of silver plays no part at all in the formation of the latent image, but is quite inert, and merely acts as so much yellow colouring matter, the place of which might be perfectly well supplied by aurine. The colour of the negatives is a fine deep yellowish-brown, with which those who work upon albumenised dry plates are perfectly familiar.

But in printing transparencies in which that fine series of colours occurs to which I have alluded, the mode of proceeding is somewhat different in *principle*, because here, in order to get these beautiful tints, we must bring the iodide of silver into play, and not allow it to remain inert in the film. For this purpose the whole of the nitrate of silver must *not* be washed out, but a little trace of it be allowed to remain in order to render the iodide of silver sensitive to light, so as to receive a latent impression.

The colour of the transparency will depend in some measure upon the quantity of free nitrate which is left in the film, or, in other words, upon the amount of washing which it receives—more washing tending to produce yellowish-browns, and less washing blue-blacks. A few experiments here will be worth more than any rules which I could lay down. Since the plate is to be exposed and developed at once, and not kept for hours or days, there is, of course, no objection to a trace of free nitrate being left in the film.

The proportions of the preservative may be modified, since this will also affect the colour of the transparency. The glycerine must be omitted altogether, because there is now no use for it; and the albumen must be more diluted with water when the blue-black tints and sepias are desired. Albumen one part, to water six parts, will give a good result, as Mr. Buxton has already stated.

Colour will depend also in some measure upon the time of exposure and the strength of the developer; a long exposure and a quick development giving warm tones, a short exposure and long development giving rich blacks. The quantity of silver in the developer also affects the colour, and so does the quantity of acetic acid. Strange to say, citric acid, instead of giving blue-blacks, as in the common wet process, gives a disagreeable rusty-brown colour. I have not yet tried any other organic acids, such as lactic, formic, benzoic, tartaric, oxalic, &c.

The amount of vigour which this method of printing gives, with short exposure and long development, is something magnificent. This, combined with the richness of colour, leaves nothing to desire. The proofs are unsurpassably fine.

I have not yet been able to get any particular shade of colour at will, beca use that requires much more experience than I have yet had with the process; but I daresay that in such skilful hands as those of Mr. Buxton all the desired certainty may be attained, and I hope he will then give us the benefit of his experience, and communicate full details of his mode of working. I have to try so many things myself in the course of the year—first one thing, then another perhaps totally different—in order to sustain the interest of these articles, that it rarely leaves me time to do more than suggest a process, which I am obliged to leave to others to put in practice and work out to perfection, feeling always sufficiently rewarded myself if I am able to point the way in a new and useful direction.

In this, as in all the processes where the sensitive film is washed after its removal from the nitrate bath, I have found it very important to use washing water free from *organic* impurities. I never use gutta-percha vessels now, but always glass ones, to wash the plates in, and find the results much more uniform in consequence.

If, when you remove the plate from the nitrate bath, you immerse it in water containing an organic impurity, there will probably be formed at once in the film an insoluble organic compound of silver. This, by remaining for hours in contact with the iodide of silver, will combine with it and form a mischievous double salt, which will fog the image as soon as the developer is applied to it. Such, at least, appears to me to be the explanation of what really occurs; and it is through the use of water containing *organic* impurities for washing the sensitive films that failures, I believe, often occur in the preparation of both moist and dry plates. The remedy for such impure water would probably be to filter it through a silicated carbon filter, and I have just bought one for that express purpose; although, apart from photography, this is an apparatus which no house should be without, since the filtration of the potable water for the table is frequently a preventive of zymotic disease, as well as adding a piquancy and brilliancy to the beverage itself.

Thomas Sutton, B.A.

FIRST NOTES OF SOME EXPERIMENTS UPON THE EFFECTS OF SUNLIGHT UPON THE COLOURS OF PIGMENTS,

With some Introductory Remarks upon the Propriety of Photographic Societies Discussing Artistic Questions.

[A communication to the Edinburgh Photographic Society.

It has often appeared to me as a strange thing that, while the followers of almost all the other professional and scientific occupations form themselves into societies for the discussion of questions of practical or speculative interest to them, the different associations of artists appear to manifest little interest or industry in extending their knowledge of the scientific and practical departments of their calling. The impression which I thus entertain may, very possibly, be erroneous; but, if so, I plead that it arises from their discussions and advances in knowledge being kept too much to themselves.

Assuming that there is remissness on the part of the artistic profession in not keeping the departments of science with which they should especially deal abreast with the main body in the rapid forward march of the present times, I submit that photographic societies may very legitimately step in and take up the neglected work. On the one hand we find many true artists enrolled in their membership, so that they are quite capable of dealing in a liberal spirit with æsthetic questions and discussing the laws of art; and, on the other hand, photographic societies are so abundantly supplied with the scientific element that they are well prepared to work in the fields of chemical and mechanical research in connection with the materials and processes employed at the easel.

There can be no doubt that the importing of this new work into the lists of subjects to be dealt with by our societies would infuse new life into their meetings, and prevent the weakening effects sure to arise from too much re-discussion of older and somewhat worn-out topics. And this extension of their sphere of activity would be a natural and healthy development of photographic societies. At their first institution they very properly confined their attention to subjects lying within the narrower limits of what was specially photographic, and chiefly in connection with the reactions of their particular chemicals and the mechanical and optical arrangements of their apparatus. But soon they began to feel an interest in chemical and optical information outside of their art-profession; and from artists—who at first stood aloof or in antagonistic attitudes towards them—at length enlisting in their ranks the subjects dealt with assumed more frequently an artistic character, and the connecting bonds between photography and the older sister arts are becoming every day stronger and more numerous. The photographer now often employs the artist to complete his work, and the artist is learning to lean more and more upon the aid of the photographer; and the combination of the artist and the photographer in the same individual is becoming less an exceptional than a common occurrence. The photographic art societies may now, therefore, have arrived at that period of their growth when they may presume freely to range over and explore subjects which in times past have been regarded as the special preserves of the artist.

There are two or three subjects of this class that I have thought of venturing to break ground upon before this Society; but that which I have chosen for tonight belongs to a sort of debatable land —it takes up a small part of the inquiry into what mischief our particular friends the so-called chemical rays are working upon the artist's colours.

Effects of Sunlight Upon the Colours of Pigments.

The undertaking a subject like this is very apt to end in experiences such as a traveller should meet with who suddenly resolves to explore a distant mountain range. From his starting-point the work seems circumscribed in extent, and of simple and pleasant execution; but soon after beginning the actual exploration he acknowledges that a portion only of his original enterprise will suffice to swallow up all the time at his disposal, and, as he penetrates into the gorges, and loses his bearings amidst the nearer subordinate elevations, his energies become engaged upon and engrossed by the minuter details. So the subject of the effects of sunlight upon the colours of pigments, although at first sight it appears a simple and not very extensive one, is no sooner attacked than a number of unexpected points of interest come into view, and questions arise which would require for their satisfactory solution the carrying out of a great many experiments of long duration. I find, consequently, that I have only made a beginning of the work, and, from not foreseeing the complexities of the subject (especially those arising from the very different influences exerted by the mediums with which the pigment may be mixed), this beginning is far from a systematic one.

The pigment, or colouring matter, may be presented to the influence of the sun's rays under various conditions:—

1. It may be in a liquid or dissolved state, the menstruum being water, spirit of wine, or other fluid.
2. It may be presented as the pure powder or as a stain or dye upon paper or other absorbent body.
3. It may be in combination with gum, gelatine, or other medium soluble in water. Such addition, while it serves to mechanically fix the powdery pigment, has the further effect of protecting it more or less from the air and gases, and possibly also of obstructing molecular changes.
4. It may be combined with pure drying oils or with spirit or turpentine varnishes.
5. The oils or varnishes may be combined with other substances that may chemically affect the pigments—as when the oil is boiled with litharge or mixed with sugar of lead or other dryers.
6. The pigment may be presented as in encaustic work or in the form of enamels or glasses.

In a systematic treatment of the subject it might be proper to conduct the experiments upon each pigment under as many of these headings as its nature would admit of. The few experiments which I have made will, however, be ranged in the two classes of ordinary oil and water-colour painting. They were originally undertaken in 1871, simply to satisfy myself as to the permanency or otherwise of some of the ordinary tube colours used in oil painting, as I had at that time resumed the brush as an amateur. The results were considerably different from what I had been led to expect. Since being asked to contribute a paper I have endeavoured to extend the scope of the experiments; but the time for this has been too limited, and, instead of clearing up the subject, these have rather served to raise doubts, and show that it is a very complicated one.

In conducting the experiments the obvious arrangement was to paint the colours on a suitable board, in the form of bands across it, and obscure a portion of each band when the board was exposed to the light.

The experiments of 1871 were conducted so that one-half of each band of colour should lie over a coating of glossy white-lead paint, while the other half was upon white cardboard, so much *magilp* being used that the half upon the painted ground dried with a gloss, while that on the simple cardboard had a dull surface. Part of each half was obscured, but it may here be stated that this different treatment of the two halves had no marked effect upon the results. This set of experiments will be referred to as sheet A.

Of the recent experiments begun on February 23rd, those with oil colours will be referred to as on sheet B. In these Robertson's medium was used to mix with the colours and pigments, and, after drying, this was further used as a varnish over them. Sheet C contains the recent experiments with water-colours and dyes. The amount of exposure to the sun which sheets B and C have received has not been half of that which might have been secured by frequently shifting them so as to face the sun when it happened to shine.

In giving the results it may be best to collect together all that is to be said of each particular pigment; and, taking first the browns, the most important of these, from its almost universal use, is—

Vandyke Brown.—In the experiments with this, in 1871, I was much surprised to find it soon lose both in depth and quality. In sheet B the colour was not nearly so soon affected, and, although the change is quite observable, it is not very important up to the present date. In the water-colour sheet C the loss of depth of colour is much greater. The general result is that vandyke brown fades in the sun, but this may be retarded by a coating of varnish. The pigment does not, however, deserve the confidence that artists have placed in it; and a very fair substitute may be had in the mixture of black and burnt sienna, used by our esteemed member, Mr. Norman Macbeth. Such a mixture possesses very considerable transparency, its permanence is assured, and browns of any quality as regards warmth or coolness may be made; but one or two definite mixtures, put into tubes, so that the artist might have a readier knowledge of what he is about, would be desirable.

With the three permanent colours—black, burnt sienna, and ultramarine—a most extensive and beautiful *suite* of transparent colours may be produced, ranging from the coolest neutral to the warmest ruddy brown, and with intermediate passages of grey, green, and blue character.

Cappah Brown.—So far as the sheet B can show, this colour is more permanent than vandyke. The exposure has not been long enough to speak of its absolute character as to permanency.

Brown Pink.—Sheet A shows how decidedly fugitive this is. So far as sheet B goes it pronounces it more changeable than vandyke.

Sepia.—Sheet C shows this as decidedly bleached as vandyke brown.

Bister.—On sheet C this is considerably bleached, and changed to a colder tone.

Ferrocyanide of Copper.—On sheets B and C no decided change is observable.

Brown, formed by adding ammonia to pyrogallic acid.—The action of the light upon this is peculiar; it greatly increases the depth of the colour, at the same time changing it to a cooler character.

Chromate of Silver.—This, which has an original colour like a darker and purpler Indian red, has, on sheet B, been changed to a warm brown. On sheet C the change has gone very far, and even the obscured part has not been sufficiently protected; the exposed parts are bronzed and iridescent, like a much over-exposed ordinary photographic silver print.

Chromate of Mercury.—This, which is originally like light red, has become on sheet B a dark, cool brown, and, indeed, where the layer is thin it is almost reduced to a neutral tint. In sheet C there is a change of colour without so great a darkening.

Vermilion.—This, as is well known, darkens in the sun. In sheet A it has assumed a dusky hue; in sheet B the change so far is rather one of tint than depth of colour, the changed colour partaking more of a brick-red character. In sheet C the change is as yet very slight.

Rose Madder.—It is very satisfactory to find that this is particularly stable in oil colours, as shown by sheets A and B.

Purple Madder.—This rather expensive colour, shown on sheet B, has failed very considerably. Whether or not some of the colours are genuine is, however, left in much doubt, as I understand it is too common a practice to adulterate the rarer ones. Judging from the rose madder, and from the character acquired by Turkey red, we should expect the madder colours to resist the sun.

Crimson Lake.—This bleaches very rapidly.

Carmine.—Also very fugitive in the sun.

Brazil Wood.—On sheet C a strip is painted with a red ink believed to be made from this. It has become darker and more crimson in colour where exposed to the sun.

Aniline Colours.—These are unfortunately very fugitive in the sun, as shown by Nos. 24, 28, and 34 on sheet C. Indeed, as a curiosity, a photographic print might be produced by exposing under a hard transparency a piece of paper stained with these colours.

Indian Yellow.—This beautiful transparent colour, so useful in glazing, is, unfortunately, not permanent. On sheet A it soon lost its fine qualities, and finally became much weakened and reduced to a dirty greenish-yellow. In sheet B, though the change has begun, it is not yet very striking, and very little effect has been produced upon it used as a water colour on sheet C.

Cadmium Orange.—This is very similar to Indian yellow. That purchased as a tube oil colour is considerably redder, but the pure sulphuret is somewhat yellower. No very perceptible change is yet produced on sheet B; but on sheet C the colour has become dirtied and impaired more than the Indian yellow on the same sheet.

Aureolin.—So far as tested by sheet B this appears to maintain its colour, which is very like that of the pure cadmium orange. There is a suspicion of darkening.

Chromate of Strontia.—This, on sheet B, has lost somewhat of its brilliant lemon-yellow colour; on sheet C it has assumed a dirty-green hue.

Chromate of Baryta.—This, on sheet B, has become more changed than the strontian yellow, but on sheet C the change is slight.

Chrome Yellow and *Orange* become darkened in the sun, and that, to a certain extent, very rapidly; but I suspect that they, like some other pigments, recover to some extent their proper colours when removed into the shade. On the extra sheet D are shown two strips—one of the pure yellow powder, the other the same fixed with British gum. An exposure for only five minutes in the sunshine caused a perceptible darkening, but most marked in the case of the mixture with gum; further exposure has not much increased the discolouration of the pure chrome, but the gummed strip has gone on darkening. In the old sheet A the change is very great. In sheet B the fine yellow colour is dirtied. In sheet C the change is not quite so striking, and on it the orange-coloured chrome is more darkened than the yellow variety.

Naples Yellow, on sheet B, is somewhat darkened.

Gamboge, on sheet C, is somewhat bleached.

Oxide of Uranium.—This, though a good yellow at first, is here given merely as a curiosity, as it is so very greatly affected by the light, becoming, after no very lengthened exposure, a dark, greenish-grey on sheet C, and nearly black in sheet B. Examined after exposure for three days it was found to be very considerably darkened.

Prussian Green.—This, on sheet C, has lost in depth and become blue.

Sap Green is not stable; the changes on the tincture will be afterwards spoken of. The strip on sheet C does not show much change, but the specimen was not very satisfactory.

Oxide of Nickel, as an oil colour on sheet B, is unaffected as yet.

Emerald Green.—On B and C no decided change as yet.

Prussian Blue.—This, as an oil colour, appears to resist the action of the sun very perfectly, as shown by the much-exposed sheet A, and the later experiments on B, where it is given pure, and also mixed with white lead. This is a very satisfactory result; but, as a water colour, it is not to be trusted. Sheet C shows a bleaching effect at work.

Antwerp Blue.—This, as a water colour, on sheet C faded very soon.

Indigo, as an oil colour, faded less than expected. It became of a pinker character. It fades much more rapidly as a water colour.

The colours tried, but previously known to be permanent, were burnt and raw siennas, bright red, yellow ochre, terre vert, cobalt blue, and ultramarine.

The pigments which, used as oil colours, appear from the experiments to be characterised by more or less perfect indifference to sunlight are ferrocyanide of copper, Prussian blue, emerald green, rose madder, pure cadmium orange (?), aureolin (?), oxide of nickel.

In experiments with oil colours it should be borne in mind that the yellowness of the medium becomes bleached in the exposed parts of the bands. This may cause an apparent change which is not due to the pigment mixed with it; thus, in the case of rose madder, the colour is rendered a more perfect pink in the exposed part from the whitening of the medium. The medium recovers slowly its yellowness in the shade.

I have now to speak of that brilliant but most treacherous of all colours, the biniodide of mercury, or "pure scarlet" of the shops. The experiments with it will serve to show what great influence the medium used has upon its permanency.

When the biniodide is formed by precipitation—as by pouring a solution of iodide into one of corrosive sublimate—a lemon-yellow cloud is formed, which rapidly changes colour, running through orange, salmon colour, &c., and more slowly changing to the brilliant scarlet. When this is used as a paint under a considerable variety of conditions there is a great tendency in it to revert to the yellow condition, and that preparatory to its complete disappearance. Since it is by far the most perfect of scarlet pigments, it is most important that its characteristics as to permanency should be studied. It has happened that naturalists have been induced to use it to depict, among other subjects, the beautiful colouring of tropical flowers; but, alas! when the painting was to be referred to in after years, the colour had either altogether disappeared or degenerated into scattered yellow and red spots and streaks. I believe, however, that I have been fortunate enough to stumble upon a treatment which will confer upon it a certain degree of permanence.

The biniodide is liable to two changes—the one becoming yellow, the other darkening in the sun. And, first, concerning the tendency to darken:—When the simple powder is exposed for a few seconds to the sun, or even diffused daylight, a very perceptible darkening is produced, and when British gum is used as the medium this change is still more decided, as seen on sheet D; * but when *gum arabic* is used so abundantly as to give a high gloss to the surface no decided change is produced, even after lengthy exposure, as shown by sheet C. Oil mediums and varnishes do not prevent this darkening. On sheet A it assumed the colour of Indian red, a dark powder appearing to be thrown out which a wetted cloth readily removed, showing the biniodide beneath it even paler than originally; but the spot so cleaned became even darker than before on re-exposure. This darkening, however, begins to disappear when the sheet is removed to the shade. It may be that the darkened particles tend to become yellow. In sheet B the behaviour is more capricious; the exposed parts are sometimes darker and sometimes lighter than the obscured part. This, I believe, arises from both changes to darkness and to yellowness going on at the same time, but in irregular degrees. I must, however, at present leave the matter in a very obscure state.

The supplementary sheet E, painted some years ago, will show the tendency to turn yellow or disappear altogether. The first strip, painted with the pure powder in water, has nearly all vanished, a few yellow streaks and some minute red spots only being left. The second strip had flour paste as the medium, and its condition is very little, if at all, better. The fourth strip was painted with the biniodide mixed with varnish; a yellow and red cloudiness is all that we now see. The fifth strip had magilp for the medium; this is reduced to a faint yellow with some red streaks through it. But the third strip, for which the medium was a thick solution of gum arabic, retains very much of its original body and brilliancy. The sixth strip was painted at a later date, and gives a different result from the fifth for magilp as the medium; it as yet shows no loss of body.

Gum arabic appears, then, when liberally used, to have the power of preventing both the darkening by the sunshine and the yellowing from molecular changes.

I shall conclude by exhibiting two instances of change of colour in liquids caused by the sunlight. Here are two bottles containing tincture of green leaves, the colouring matter being chlorophyll, which has such interesting optical properties. The two bottles were filled from the same stock, but one of them has lain for about two hours in the sunshine, and you see the colour has been degraded from the beautiful and somewhat blue-green to a sort of brown-yellow, having only the faintest trace of green in it. The other example is an old registering minimum spirit thermometer. This was used for some years as a garden thermometer, and you may observe the liquid, which originally possessed a fine pink colour, has become bleached to a faint, dirty yellow, and very unsuited for its purpose. I also place on the table a small spirit level which I filled a number of years ago; but the coloured liquid in it is as clear as when put in, and the colour is perfectly permanent. I would strongly recommend the adoption of this liquid, which is a tincture of iodine, for spirit thermometers and other similar purposes.

R. H. Bow, C.E., F.R.S.E.

* After a few days the changing to yellow becomes so decided as to do away with the darkening by the sunshine; but this yellowing is not decidedly shown in the shaded part of the strips of colour.

ON CLEANING PLATES.

Although every photographer may be conscious of the fact that an absolutely clean plate is necessary to the production of a thoroughly good negative, yet there is a strange lack of interest in this important branch of photographic work. Carelessness in cleaning the plate, or the *method* employed in so doing, is very often the direct cause of failure in getting good negatives.

Now, it is not my intention to give a *résumé* of the various means employed for cleaning plates, but simply to give the mode of procedure which I have found to give the best results, after having given careful thought to this subject during a period extending over from three to four years.

The method, then, which I have long used with unvarying success is this:—

For New Plates I have a board about 15 × 12, covered carefully with baize, or soft new carpeting; fastened with the wrong side uppermost would be still better. On this the plates are laid for roughing the edges, which may be accomplished by means of a small file or a strip of thick glass, carefully taking off the raw edge by either of the above methods, and giving a roughness about one-eighth of an inch on the surface to enable the film to bite firmly. I am careful to hold the plate on the board by means of a clean cloth, and not to put the naked hand in contact with the surface in any way whatever. This precaution is very necessary, as many make their glass ten times dirtier than it otherwise would be by the perspiration which is communicated from their hands.

Having roughened all the edges in the manner described set the plates upright against a wall, and proceed till you have roughed enough for your use, keeping them about half-an-inch from each other to prevent scratching from the particles of glass distributed over the plates by the roughing.

Now take them one by one and dust them lightly but thoroughly before beginning the next operation, in order to remove all impurities, such as grease, &c., which is effected as follows:—Provide a board covered with soft linen, and lay each plate on it, rubbing it with a linen pad and a mixture of nitric acid and water—about one part of acid to four parts of water. Pursue this for a couple of minutes, till you think all grease has been removed, and then rinse under a steady stream of water, turning the plate about, for the purpose of erasing every trace of acid from it. Having provided beforehand a dish of clean water you immerse them as you finish them one by one, taking care that, as you put them in, the edge of one does not scratch the surface of the other.

Having done all in this way, proceed to dry them one by one. Have a large board upon which are several folds of old linen; lay the plate on, and dry them by means of a large linen pad, giving a circular motion in the rubbing till every trace of moisture has entirely disappeared.

To give the finishing touch to the plates clean them with collodion. Have four cloths—two for the collodion cleaning (one to lay the plate on, and the other formed into a pad for rubbing off), and two for finally polishing in the same manner. Get an iodising bottle for your collodion, pour about half a teaspoonful on the plate, and distribute it over the whole surface by rubbing, with a circular motion, with a pad of cotton wool or good wadding. Having done this to your satisfaction rub off with your first pad, and transfer the plate to the final polishing cloths, carefully observing that the plate has an equal amount of polishing in all parts, and not merely in the middle only.

The test for cleanliness is to breathe gently on the plate; and, if the breath go over evenly, revealing no marks, and dying gradually off, the plate may be considered chemically clean, and should be inserted into a grooved plate-box (previously well dusted out), as being far preferable to stacking them up against each other. They should be dusted with a camel's-hair brush in the dark room (or room adjoining) before being used for making the negative.

I should just say here that the cloths used in the polishing ought to be of old linen made soft by much wear, boiled, washed, rubbed without the aid of soap, rinsed in two or three cold waters, and dried free from dust.

The treatment for old varnished plates is very simple but most effectual. Immerse the old negatives in a tank or dish containing a good supply of boiling water, with the addition of some washing soda. After being left in this for about two hours the films gradually slip off, or will easily come off by slight friction with the hand. Now, to remove thoroughly all bits of film and all traces of soda rub them with strong nitric acid, rinsing thoroughly under the tap, and afterwards proceed precisely the same as laid down for new plates.

This mode of cleaning plates, new and old, which has given so much satisfaction to me will, I am sure, prove equally satisfactory in the hands of any of my photographic brethren who may use it.

Harry Hallier.

SPOTS ON POSITIVE PRINTS.

The "epidemic" which M. de Constant spoke of some time ago as having fallen out amongst French photographers' prints has excited no little interest in the way of endeavouring to account for the cause of the evil, as a first step to proposing a remedy. Photographers in this country are very often troubled with the same plague, and have only too much difficulty in finding the reason, so that any notes or suggestions from competent persons upon the point will be welcome. A very feasible suggestion as to one at least of the causes was recently made by a lady, in a letter to the Photographic Society of France, who blamed tobacco. Our experience would bear hers out in that respect to some degree, and certainly the hint is in any case a good one. It would conduce to both order and cleanliness if smoking were never either indulged in by principals or permitted to subordinates in photographic workrooms.

But, passing that by, we have pleasure in presenting to our readers a few notes and experiences upon the topic by Count Ludovico de Courten, who dates from Florence. He has been stirred up to examine the matter by the recent discussion, and, after many lamentations over the sad but undeniable fact that nobody can be sure that silver prints will not fade, makes one or two interesting memoranda.

He, for instance, passed first in review the whole of the silver prints in his possession, and found that, although the mass of them was fairly preserved, a considerable number of *cartes* had gone, especially those lying about in albums in the sitting-room, where they would be constantly turned over.

About a dozen years ago M. de Courten bought some stereoscopic views in Paris which looked very brilliant, and which were mounted on card having a gold line round the pictures, but which here and there the prints overlapped. He found them mounted too far apart, and so took them off and remounted them on plain boards; but several years after the marks of the gilt lines appeared through the surface of the prints, and the word "*déposé*" with some other marks that had been covered by the prints when on the old mounts. These marks had a pale-yellow look, and, moreover, the prints were dotted all over with spots of the same hue. These marks deepened until now they have quite obliterated the original tint of the photograph wherever they are. This is a strong proof that gilded mounts of any kind is a bad practice; but the question is—why?

First of all, gilding of this kind is not done with real gold, but with a yellow metallic dust of extreme fineness, known in commerce as "gold of Judea," or painters' bronze, and which is, chemically speaking, a bisulphate of tin. This substance is applied in a peculiar way. The designs, &c., on a mount destined to be gilded are first printed in the lithographic press with a *mordant gras*—a gummy ink of a pale-yellow colour, over which when dry or tacky a gilder's brush charged with the powder in question is rapidly passed. Where the ink mucilage is the metal adheres. This looks a very simple operation and safe enough, the unadhering powder being dusted off. But practically, on examination, it will be found that the whole of the powder is *not* off. So fine is it that a certain proportion adheres in the fibres of the cardboard more or less all over the surface, doubtless going to produce those spots which appear so often and so mysteriously. In common cardboard this metal superstratum will often be quite visible to the naked eye, and until it be completely removed the mounts should not be used. Even a thorough washing will not always do this, and M. de Courten has often even brushed a cardboard energetically; for, after all, a strong magnifier will show a multitude of these metallic particles lodged in the inequalities of the surface.

And that is not all. A packet of such cards once introduced into a workroom become centres of the pest, for they cannot be handled without scattering about some of their dust. It is so fine that the air carries it everywhere; it is worse than a bottle of pyrogallic acid spilt in the room. Enough will come from a bundle of these mounts to make the prints spot for a very long time.

M. de Courten's theory as to the action of these minute particles of metal is that a sort of voltaic action is set up, after a microscopic fashion—the bisulphate of tin acting on one side, the reduced silver on the other, with the paper acting as a porous diaphragm between. What is certain is that the metallic particles which correspond at the back to the yellow spot in front become black, while those that are not covered retain their golden colour with but small alteration.

Incomplete fixing, an acid glue, or the action of moisture, attracting and gluing to the surface of the wet albumenised paper those particles, all help and favour the development of spots of this kind, as do other things which would of themselves destroy the prints, such as a strong fixing and insufficient washing.

M. de Courten thinks that albums gilded in the same way are hurtful, being sure to affect the print. Unmounted prints keep, in his opinion, best of all.

The evidence, therefore, goes to show that all gilding should be avoided; and mounts with hyposulphite must be carefully avoided also. It clearly becomes a much more difficult and important matter than most people think to get the print properly protected from influences that affect it injuriously after leaving the fixing solution, and having been thoroughly freed of it. On every side the silver print is assailed with dangers. It will deteriorate in a room if not kept airtight; for the fumes of gas or coal will more or less touch it. Shut up in an album, if the surface be not varnished, or if the album be not perfectly plain and free from this dangerous gilt, the print is just as liable to perish; and if kept unmounted, moist hands fingering it will sooner or later tell on its condition for the worse. Silver prints *may* be permanent, but they are so very delicate that the greater number perish for one which is so happily circumstanced as to be able to remain.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 14	London	9, Conduit-street, Regent-street.
„ 15	Bristol and Clifton Amateur	Philosophical Institution, Clifton.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held in the Bible Society's Rooms, on Wednesday, the 1st inst. There was a large attendance, and the President, Mr. R. G. Muir, occupied the chair.

After the usual reading and approval of the minutes of the previous meeting, the following gentlemen were elected ordinary members:—The Rev. H. M. Robertson, Dr. Dickson, Messrs. A. Henderson, A. Fullerton, W. H. Moss, J. R. Wight, R. Dryburgh, J. Dryburgh, R. Simpson, J. Simpson, and J. C. Pottage.

Mr. R. H. Bow, C.E., then read a paper entitled *First Notes of Some Experiments upon the Effects of Sunlight on the Colours of Pigments, with Introductory Remarks on the Propriety of Photographic Societies Discussing Artistic Questions.* [See page 171.] The paper was illustrated by a number of specimens and some experiments, and was listened to with much interest.

Mr. Pringle thought professional photographers were much indebted to Mr. Bow for the information contained in his paper. He said they all knew that there was a great and gradually increasing demand for painted photographs, and it would never do to let even a suspicion of their want of permanence enter the public mind. The only way to keep clear of that was first to make sure of what pigments could be relied on, and then stick to them.

Mr. W. Neilson quite agreed with Mr. Bow on the advantages likely to result from the members of photographic societies discussing artistic subjects. The Edinburgh Photographic Society had not neglected the subject altogether, but there was, he thought, room for its doing more in that way. He said that artists were not ignorant of the fact that many of the colours with which they were supplied were unstable; but there was no doubt that such systematic investigations as were being conducted by Mr. Bow would be of much value to them. It was well known that most of the old masters made their own colours, and he had no doubt that it would be better for purchasers of pictures if their successors of the present day would follow their example.

Mr. J. M. Turnbull (in moving a vote of thanks to Mr. Bow) said that though they were not, as a Society, all artists in the sense of being painters, it was, nevertheless, a subject in which they were very much interested. A great many of their large photographs were finished in oil or water colours; it was, therefore, a subject which concerned them as much as if it had been one of a purely photographic nature. He hoped that Mr. Bow's able paper would be the means of arousing the attention of artistic bodies, and leading them to discuss and thoroughly exhaust a subject of such vital importance to them. Artists generally were too much in the habit of overlooking and despising subjects of a mechanical nature in connection with their art. Mr. Bow's experiments had clearly proved that a few weeks' or even days' exposure to sunlight was sufficient to affect more or less, and in some cases entirely to destroy, many of the colours used in oil and water-colour painting. If the artists of the present day wished their works to be seen by posterity as they painted them it behoved them to pay immediate attention to the subject, and, if possible, to devise a remedy. He pointed out that through the fading of even one colour in the face of a portrait it destroyed the just balance of the colour, where the flesh-colour was bleached; and through the darkening of the yellow it often left the face a sort of degraded greenish-yellow hideous to look at. He gave as instances of faded paintings two well-known works of one of our leading artists, in which he had to repaint many of the delicate colours. If, then, that had to be done in the lifetime of the artist, what would they be in after years, when the sun of a hundred summers had shone on them? Turner, in many of his water-colours, had made a liberal use of the fugitive lakes—so much so that Ruskin, in his *British Painters*, remarks that, "to see one of Turner's works in perfection, or as the artist intended it to be, it would require to be seen within a fortnight from the time it was painted." It had been the fashion to look on photographs as of a fleeting and evanescent nature; but surely the much-abused silver print has a longer lease of permanence than that! He warned photographers that most of the fine effects produced in water-colour on the basis of a silver print were less stable than silver prints themselves. Many colours, particularly those of the mercurial salts, could not be applied in a moist state to a silver print without bleaching it in a few minutes. That would be seen by washing the colour off again; in fact, from the moment a silver print was covered with pigments in a moist state a process of action and reaction commenced which resulted in their mutual destruction. With regard to what Mr. Neilson had said about the permanence of the colour of the old masters, he thought that was mainly due to their using fewer colours, and even those few were mostly found in a natural state, as earths, &c. They mostly painted in a more solid manner and with a larger body of colour, while many of the modern painters glazed their work with a colour which faded in a very short time, the colours used most in glazing being the very ones the light most affected. The great majority of modern colours were chemical combinations—many of them a metallic base with an organic compound, which would never be a stable colour. He hoped Mr. Bow's labours would not end there, but that he would pursue the subject, keep the different colours exposed to sunlight, as a longer exposure might develope a great deal more than was apparent at present, and that he would favour the Society with another paper on that most interesting subject. He begged to move a hearty vote of thanks to Mr. Bow for his able and excellent paper.

The vote was carried by acclamation, and the meeting was adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held at the Free Library, William Brown-street, on Tuesday evening, the 31st ult.,—the Rev. J. D. Riley, Vice-President, in the chair.

The minutes of the previous meeting were read and passed.

Mr. Gilbert Dear and Mr. W. H. Kirkby were elected members of the Association.

Mr. J. H. T. Ellerbeck exhibited a Howard's portable tent, which he intended to use for changing and developing dry plates.

Mr. Lewis Hughes handed round a small nugget of silver, which he had obtained by fusing his waste silver paper with bicarbonate of soda and borax on a smithy fire.

Mr. O. R. Green showed forty 11 × 14 views of the wildest and most beautiful scenery of the United States, consisting mostly of views of the district of Colorado, Rocky Mountains, &c., taken by Mr. Jackson, the photographer to the United States Government Survey Expedition, under Professor Hayden. Mr. Green, in describing the views, detailed the difficulties under which the photographer in those districts laboured. Not only had everything to be carried on horseback, but many miles had to be traversed, and sometimes heights of 3,000 feet to be scaled, before a suitable standpoint could be obtained.

Mr. Forrest and Mr. Keith both spoke of the exquisite character of the views, and of the remarkable success of Mr. Jackson in obtaining such excellent pictures under such difficult circumstances.

Mr. W. Atkins then explained the construction of the Woodbury sciopticon, and afterwards exhibited by its aid a number of transparencies taken by the members.

The meeting was shortly afterwards adjourned.

Correspondence.

Specks in Bromide Films.—The New Mode of Making Bromide Emulsions.—A New and Objectionable Term Imported from America.—M. Silvy.—Self-Developing Organifier.

Just as I was leaving home for England the postman brought me an interesting letter from one of the readers of my articles in the *Moniteur*, on the subject of the bromide process with the bath, viz., M. Clement Sans, of Saurat—a gentleman whose name appears in the report of the last meeting of the Photographic Society of France, at page 151, as the author of a new mode of making encaustic paste, and who is a well-known French amateur. His letter relates to a very singular defect in bromide plates which I have never yet met with and cannot explain, so I will translate a portion of his letter in hopes that some of my readers may be able to throw a light upon this mystery. He says:—

"I have followed with the most lively interest the publication of your new moist bromide process. Preserving a moist instantaneous plate during a whole day is a great service rendered to photography. All conscientious photographers will thank you for this, and, for my own part, I cannot be too grateful. I am an amateur, and I love especially to reproduce nature in motion, so I hastened to try a process which permits of this kind of work without necessitating the hurry that is involved in the common wet process, so that we can wait patiently until the proper moment arrives for uncapping the lens.

"As soon as your new process appeared I tried it. With a pair of Ross's stereoscopic lenses, with full aperture, the exposure was as instantaneous as lightning *(instantanéité foudroyante)*, and the image appeared in full detail and without fog; but I have never been able to avoid an infinity of minute black specks which are produced in the lights, and transparent specks in the sky. One would suppose these were particles of microscopic dust; but my collodion, bath, and washing waters have all been filtered with the most scrupulous care, as well as the hygroscopic preservative. The tendency to these spots is very decided; but that ought not to be, because every trace of free nitrate is removed by thorough washing.

"I am not a novice in photography, and have always succeeded hitherto in discovering the cause of my failures in other processes, but in the present case I am completely baffled."

He then tells me in a postcript that his glasses were always covered with a preliminary coating of weak albumen. This was quite wrong, because moist plates do not require this treatment. It is not at all probable, however, that the spots proceeded from this cause. Had he used a solution of india-rubber that might then have occasioned them.

I have never had this trouble myself, which I must have had if the spots proceeded from bromo-nitrate of silver in the film. To what, then, can we attribute them if all the solutions were filtered? I am inclined to think that they have proceeded from particles suspended in the collodion. An impure bromide might, perhaps, produce them; or, if the pyroxyline had been washed in water containing carbonate of lime, some insoluble sulphate of lime might have remained in it. At anyrate the trouble is one worth ventilating, and I shall be greatly obliged to any of my readers who can throw a light upon it. Sometimes the use of unfiltered bromide of potassium solution, or *carbonate* of ammonia (which I detest) in the developer, may produce spots. My correspondent should expose a plate as soon as it is prepared, and see if they occur again; but, being a clever old photographer, he will, of course, have done this, for that would be the most obvious first experiment to make. Another experiment would obviously be to pour the developer over a plate as soon as it was prepared, and without putting it into the dark slide and exposing it to light at all.*

Mr. Herbert B. Berkeley has written a letter to our Editors, which they have forwarded to me for a reply, respecting his failure to make a collodio-bromide emulsion by the method recommended by me at page 73, which consists in adding bromide of silver, precipitated from aqueous solutions and then washed with spirits, to plain collodion; but I see from a more recent letter of his to this Journal that he has at length succeeded, so I have no need to reply. I would advise to press the washed bromide of silver between blotting-paper, in order to remove the last trace of water. The quantity of oil added should be extremely small, and is not necessary in order to form the emulsion; I merely suggested it as an organifier. A few drops of bromised collodion is a great help towards making the bromide of silver emulsify nicely, whilst free nitrate has the contrary effect, besides being injurious in other ways.

I am greatly pleased to find that this method of making both collodion and gelatine emulsions of bromide of silver is coming into fashion, for I believe it to be right in principle, whilst the old-fashioned method of mixing the salts in the collodion was evidently wrong. The trade may now, perhaps, find it worth their while to supply dry bromide of silver in light-tight bottles, or possibly even collodio-bromide emulsions which may keep indefinitely if prepared in this way.

In Mr. M. Carey Lea's recent articles on the above subject he used an expression which was new to me and puzzled me greatly for some time, viz., "sensitising bath" as applied to a bath of preservative, or organifier. I do hope this expression will not come into general use, for it is a most unfortunate one, and will lead to endless perplexity, to say nothing of its being manifestly wrong. A preservative does not *sensitise* a film of bromide of silver, for that is most exquisitely sensitive without it; it simply supplies to it the organic matter which we find to be necessary, and the proper term for it would therefore be "organifier"—*preservative* being quite as erroneous as *sensitiser*.

* Does our friend smoke tobacco whilst preparing his plates? That might, perhaps, account for the spots.—T. S.

In consequence of some editorial remarks respecting M. Silvy, amongst the replies to correspondents in the last number, I have written to that gentleman to ask him kindly to send me the plan of his studio at Bayswater for publication, and also to tell me how long he remained there.* I cannot quite agree with the author of those remarks that much more depends upon the man than upon the studio, the camera and lens, or the process employed. The right man must work *by the right means*, or nothing great can be achieved.

Mr. F. Beasley, in sending me some beautiful views taken in Ireland and Derbyshire, by the Fothergill process, inquires whether my moist plates can be developed by the alkaline method. Of course they can, when all the free nitrate has been washed out of the film before applying the organifier, and this is the best mode of developing them, because about one-half of the exposure necessary in the other case will suffice, and because a rather softer negative is obtained. Plain pyrogallol will also bring out a faint image, which may afterwards be intensified in the usual way. The self-developing films alluded to by "W. S. S.," in the last number, produce the visible image in this way. The suggestion of this correspondent will probably turn out to be a valuable one, and I hope soon to try it and work it out. The pyrogallol in the organifier will prevent the latent image from being gradually effaced by the unconverted bromide in the film—an effect which seems always to occur when there is nothing in the nature of a developer in the film.

Stoak Vicarage, April 2, 1874. THOMAS SUTTON, B.A.

* From one of our Answers to Correspondents in last number Mr. Sutton will see that we have already published a description of M. Silvy's studio, together with an engraving of it.—EDS.

PHOTOGRAPHIC ENAMELS.

To the EDITORS.

GENTLEMEN,—I think you would do much good if you were to direct the attention of photographers generally, through your Journal, to the great value of vitro-enamel photographs to those who are anxious to have everlasting pictures of their relatives or friends, and to the considerable amount of business likely to be done in thém. The process would be more adopted, as it is simple to work, the results beautiful, and, most important of all, permanent.

When last in Italy I noticed in the cemeteries—particularly at the Santo Campo, Bologna, where may be seen some of the finest monumental sculpture in the world—photographs suspended to each tomb or monument of those interred, but, in many instances, so much faded as to be with difficulty seen—a cause of grief and regret to relatives and friends. How invaluable the photo-enamel picture for such a purpose as this! In the case of Livingstone, the hero and discoverer, whose body is just being brought home to be placed in Westminster Abbey, to a monument erected to his memory should be attached a vitro-enamel portrait of the great man, which posterity might look upon with pleasure for its truthfulness.—I am, yours, &c., JOHN J. ATKINSON.

Manchester-street, Liverpool, April 7, 1874.

[Our opinion of the value of enamels is too well known to necessitate our adding anything to the foregoing excellent suggestions.—EDS.]

PHOTOGRAPHIC ENGRAVING.

To the EDITORS.

GENTLEMEN,—I thank you for the manner in which you put my position forward, in a late leader, on the subject of the engraving process, by which the portrait of M. Davanne in the *Bulletin* of the French Photographic Society was produced.

M. Rousselon has, I must say, succeeded in working out this process to a very satisfactory practical issue, and the greatest credit is due to him for having done so; but the method as at present worked remains substantially the same as it was when by accident I obtained the first grain relief from which the first proof was ever made.

This, as I have already stated in a former publication, was due to the fact that some pigments (of which I by chance got hold of a sample), through the peculiar action of the bichromates, become granulated or broken up into a fine grain when mixed. The same pigment, however, will remain perfectly homogeneous when mixed with gelatine only. The black known as "charcoal grey" is peculiarly affected this way, also some of the blues, and the insoluble residues left after dissolving the lakes in ammonia; while Indian ink and other colours are not so affected.

I am sorry that M. Rousselon, a gentleman I greatly esteem, should think fit to take the whole credit of this invention to himself and ignore me entirely in the matter—at any rate, as the originator of it; and this more especially as at one time I was so fortunate as to assist him over a difficulty that at the time seemed to prevent the process ever being used for anything but very small plates, and since which engraved plates from two to three feet long have been successfully obtained.—I am, yours, &c., W. B. WOODBURY.

Cliff House, Greenhithe, April 2, 1874.

THE ENAMEL SCANDAL.

To the EDITORS.

GENTLEMEN,—It is with some hesitation that I ask to be allowed to take up valuable space in your Journal with personal matters; but the statements contained in Messrs. Robinson and Cherrill's letter, in your issue of yesterday's date, are so much at variance with facts that I trust your readers will excuse me for trying to put the affair in its true light.

In February, 1872, Messrs. Robinson and Cherrill sent to me for specimen enamels, with which they professed themselves satisfied, and very shortly afterwards they purchased my method, requesting me to give them as full particulars as possible as to the kind of furnace, tablets, chemicals, &c., as they stated they *knew nothing whatever* about the matter. I complied with their request; and, after a few weeks of experimenting, during which time I had to answer a string of twenty questions on the subject, all went on smoothly. Amongst other letters I received one in which they stated that, after a goodly round of failures, they were then able to proceed, and if anything should go wrong they knew where the cause lay. This, of course, was only what might have been expected in the obtaining a mastery of the details and working of any new process.

They subsequently wrote eulogising the process and complimented me upon the skill and care I had bestowed in working out the method, and urged me strongly not to let any one have the process without first signing an agreement not to divulge the secret. In another letter they say—"Don't forget to enjoin secresy in future to all those to whom you sell the process." In a later letter they regretted that I had given any indication of my method in your ALMANAC, but said:—"No one can work out the thing *de novo* even after he has read the article in THE BRITISH without much patient experiment." Again, in the same letter:—"A gentleman, one of the most distinguished portraitists in London, who has been working at Grüne's process (without success) for months, tells us he has read your article, and does not see anything in it. He has actually trodden on the jewel he was looking for without seeing it."

Notwithstanding all this, however, they persistently declined to give me any formal writing or paper as to the fact of their having purchased the method from me, or of their success in using it; nor would they allow me in any way to use their name to promote any interests as to selling the process.

Then a paper by the "Old Photographer" appeared in the *News*, speaking in unmeasured praise of some enamels made by Messrs. Robinson and Cherrill, who, the writer stated, had informed him, on his asking where they obtained the process, that "it was all published in the *News*;" and it was not until my letter of remonstrance to Messrs. Robinson and Cherrill on this untruthful statement, and my informing them that I had written to the *News* respecting it, that I heard a single word about their having tried to see what they were pleased to call their "experience of *the* enamel process." But, from their reply, I gathered that they were preparing a pleasant surprise for me—that they were going to send me a cheque for fifty pounds, *after* they had succeeded in selling the process. At that time I had faith in them, and refrained from giving publicity to the letter I had written to the *News*. Results now show how much I was to blame.

Then came the letters, of which I sent you copies, respecting the patent in America (and here I must say that the views you expressed as to that part of the affair cannot fail to be endorsed by every unbiassed reader), by which it will be seen that I was to receive as my share one-sixth of the proceeds, and I had really acceded to this offer on condition that I should receive fifty pounds at once (to be afterwards deducted out of my share) and an agreement in writing as to future profits. This they positively declined to do, and would, as they said, have nothing to do with any bonds or agreements. There the matter ended, save that on my declining to sign the patent papers except on these conditions I received a severe letter, in which I was denounced as "impracticable," &c., and that they had "done with me and done with the process."

I must acknowledge, with pleasure, that I am very sensible of the kindly disposition they showed in using their influence with Mr. Vanderweyde, when I was, as they felt, very unjustly dealt with by those who had the sale of his patent process in Hull; but I cannot see what possible purpose was to be served by their mentioning this fact except as lauding their own magnanimity, for it is quite foreign to the subject.

A few words in conclusion. Messrs. Robinson and Cherrill say they are glad to find I have carried out a patent for my process in America; all they ask is to let the Americans see their specimens and mine—let them choose which process they will buy—and that they do not mind saying this now that I have taken up arms against them. This is all very well; but they must not forget that, to quote from one of their letters, their improvements "are all connected with the simple mechanical portions of the process—in the use of brushes, glass plates, and very small dishes when manipulating the films, by which means we effect great saving of time." But, however superior may be the results which skilled manipulators like themselves can produce with a given process, it does not at all prove that such process differs in principle from that by which the meanest and poorest results are obtained by an unskilful or unpractical person. In this enamel process it is simply and entirely a question of personal skill as to who shall produce the finest results.

Messrs. Robinson and Cherrill will do well to consider the wisdom and legality of the steps they are taking in offering for sale to our American brethren, as a secret process, any part of my method of enamelling for which the patent has been obtained.—I am, yours, &c.,

Anlaby-road, Hull, April 4, 1874. W. T. Watson.

Charge of Larceny against a Photographic Assistant.—On Thursday, the 2nd instant, Richard Turnbull, 29, described as a photographer, was charged before Mr. Alderman Ellis, at the Mansion House Police Court, with larceny, under the following circumstances:—The prisoner was in the service of Mr. George Taylor, a photographer, of Crown-buildings, Queen Victoria-street, and Forest-hill, as chief operator, at a salary of £4 a week, down to the 20th of March. About a fortnight ago complaints were made to Mr. Taylor of photographs taken by him being exhibited outside a shop in Park-street, Camden Town, and on going there he saw in cases exposed in the street upwards of 200 copies of photographs, all his own work, and many of them of quite recent dates. The name "Richard Stuart" was upon the cases as the photographer. On the first floor he found a boy named Gidney, who had formerly been in his service, and a woman whom he had known by sight as the prisoner's wife. On returning to Queen Victoria-street he asked the prisoner if he had any connection with the studio in Park-street, and he stated most positively that he had not. He was discharged from Mr. Taylor's service next day, and he then explained that the whole thing was a mistake, for the studio belonged to the lad Gidney. For some time past the prosecutor had been missing photographs from packets which he had sent from Forest-hill to his studio in the City, and also a quantity of materials used in the business. The prisoner was alleged to have corrupted a boy who was in the prosecutor's service, and to have induced him to bring him gold solution from the workshops at Forest-hill. After his dismissal the prisoner, replying to a communication from the prosecutor's solicitor, addressed an insulting letter to him. On arresting the prisoner at the studio in Park-street, the police found two or three hundred portraits, some views of the Albert Memorial, a large number of negatives, some gold solution, and a bottle of cyanide of potassium, worth £50 in all, which Mr. Taylor identified as his property. In reply to the charge the prisoner indignantly denied that he had stolen the goods, saying he could prove that he had bought them with the business from a man named Turner. The prisoner, in answer to the usual caution from the Bench, said he would reserve his defence. Mr. Alderman Ellis committed the prisoner for trial, but admitted him to bail in his own recognisances in £200 and two sureties in £100 each.

The Transit of Venus.—In the course of the next four or five months several Government expeditions, carefully prepared and equipped, will start from this country for distant parts of the globe in order to observe the transit of the planet Venus early in December next. Solar photography (says *The Times*) will be largely employed during the transit as an auxiliary to the eye-observation, and results of extreme accuracy are anticipated from it. Five magnificent photoheliographs, one to each principal station, have been constructed for the occasion by Mr. Dallmeyer, with such exquisite refinement of scientific care and ingenuity that their optical properties may be pronounced the most perfect yet attained. The photographs taken by them will be free from all distortions and imperfections other than those which might possibly result from unequal contraction of the film in the wet collodion process, but which are totally inappreciable in practice, if, indeed, they exist at all. The chemical processes best calculated to produce perfect pictures have also been very carefully considered by Dr. Warren De la Rue, Captain Abney, and other eminent photographers. Such, in short, will be the mathematical precision and sharpness of outlines in these photographs, that they will be perfectly available for exact micrometric measurements of the minute and delicate differences of distance and position with which astronomers will be concerned in their subsequent investigations. Like the principal telescopes the photoheliographs are equatorially mounted, and carried along by clockwork with the same velocity as the sun. For the sake of popular explanation, they may be said to resemble large and powerful telescopes, fitted with a camera at the eye-end. Nearly in the primary focus of the object-glass is placed an instantaneous exposing shutter, held in position by a detent, which acts against a powerful spring attached to the lower end of the shutter. A slit across this shutter, ordinarily about one-tenth of an inch in breadth, can be widened or contracted by an adjusting screw to suit the intensity of the sunlight; and, on the release of the detent, a momentary flash, darting through this slit as the shutter flies down, paints a four-inch picture of the sun on the sensitive collodion plate in a very small fraction of a second of time. In this way sun-photographs may be taken with great rapidity at certain stages of the transit, Venus appearing in the pictures as a black spot on the sun's face about one-eighth of an inch in diameter. But for the yet more rapid portraiture of the planet's changes of position at the critical phases of ingress and egress, use will be made of an ingenious apparatus known by the name of its inventor, M. Janssen. This consists of a device for exposing, at very short intervals, parts only of a rotating collodion plate along its outer edge. The pictures thus taken will be very small, comprising only that bit of the sun's rim across which Venus may be moving. This, however, is all that will be needed just then; and as thirty or forty of these pictures will be taken in about two minutes, and the instant of each exposure be accurately noted, they will furnish the means of obtaining an exceedingly close approximation to the true moment of the breaking of the black drop. For the other stages of the transit full-sized photographs will obviously be needed, so as to exhibit the sun's centre as a fixed referring-point for admeasurements. A series of such pictures taken at our southern stations, where the whole transit will be visible, will possess great value in connection with the Halleyan method of observing the whole duration of Venus's passage. They may, indeed, be said to amount in principle to a modification of Halley's method; for they will register with consummate accuracy, from widely-severed stations, the position of the chords described by the planet's centre across the sun's face, for comparison with the positions of those chords as determined by the method of durations. Those taken near the middle of the transit will also afford a direct measure of the least distances between the centres of Venus and the sun, which is again another modification of the same method. In all these photographic operations it is likely that the dry-plate process will be chiefly employed, on account of its great simplicity and rapidity.

WRINKLES AND DODGES.

I never saw or read of any one doing it just as I do. I place my paper on the solution, tap it (the paper) gently with my fingers to break bubbles (if any exist), but to make sure I lift it up at the corners and examine, replace, and then *gently oscillate* the dish, so that the solution is in motion most of the time the paper is on it. By this means the solution is of the same strength throughout, and each piece of paper receives the same amount of silvering; and the silvering is done in less time and more thoroughly. After each piece is sensitised I hang it up by one corner, so that the opposite end (the drip-corner) hangs by the side of the dish, and just touches the solution. By this means I save all my drippings.—J. H. Hunter.

Some time since I had to copy and enlarge the middle picture of a group of three persons, in which the outside ones rested their hands on the shoulders of the middle person, in such a manner that they could not be vignetted off without taking all but the face of the middle person. I made a print with them on, and then mixed pure albumen with india-ink, and with this painted the hands out without blotching the print much. It was scarcely noticeable when framed. Mixing albumen with the ink is an old thing, I know, but may be of use to some of your many readers, if you think it worth publishing.—E. K. Abrams.

I have a little dodge in tinting medallions. It is simply this:—Having assorted the sizes I place the cards in a cigar-box and take them to my printing window. Having first placed a folded paper on the sill, I proceed to place my prints behind the masking-glasses (my masks are pasted to 1-4 glass), and lay them on the folded paper, placing as many in the light as I can readily tend. No clothes-pins or pads. This enables me to tend about six prints, alternating, keeping me busy.—E. B. Cores.

I had a broken ambrotype to copy. It was in a dozen or more pieces, made on white glass. The breaks showed badly, and the black varnish on the back was all chipped; so I took the picture carefully out of the case and matt, &c., carefully cleaned the black varnish off, took a ferrotype plate, gummed it, then I took a brush and india-ink and carefully blackened the broken-edged places on the gummed plate, pressing the edges close together, taking care that no air-bubbles remained under the plate. I noticed before, in copying a broken picture, that the cracks were seemingly larger than in the ambrotype, and I thought it might come from the refraction of light through the cracks. By blackening the edges I stopped it.—J. H. Hunter.

I have made a little discovery (new to myself at least) in regard to clearing old baths of iodide. Let the bath get almost cold enough to freeze, and the iodide will form in the shape of very fine crystals, which are easily filtered out. I find the method very simple and effectual, especially in winter. When the summer comes I shall adopt the plan of packing my bath in ice to produce the necessary degree of cold. This may be old to you, but I find it a decided saving of time and labour over the old method of diluting, filtering, and evaporating. —S. M. Miller.

[For the above useful "Wrinkles and Dodges" we are indebted to our Philadelphia contemporary.—Eds.]

EXCHANGE COLUMN.

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

I will exchange five pints of Mawson's best negative collodion and iodiser (unopened) for four pints of Thomas's collodion and iodiser.—Address, V., The Cedars, Esher, Surrey.

Wanted to exchange, two French quarter-plate cameras and lenses for one one whole or half-plate camera and lens. Differences adjusted in cash.—Address, A. W. B., Trinity House, Leeds.

I will exchange a first-class steel screw press and cameo die, complete, cost £8, quite new, for a *carte-de-visite* lens; no objection to a French or German lens, if good.—Address, P. H. D. B., Watling Works, Stony Stratford.

I wish to exchange a new whole-plate portrait camera and lens, cost £10, and not been once used, for a half dry-plate camera and lens with changing box. Difference adjusted.—Address, J. GREENE, Cross Mill-street, Leeds.

I will exchange a quarter-plate portrait lens (with centre lens, after the triplet style, by Gasg and Charconnet) for groups and views $7\frac{1}{2} \times 4\frac{1}{2}$, for a cloth background and 12×10 glass bath.—Address, G. L. R., Sherborne, Dorset.

Wanted to exchange, a useful Kinnear camera, $8\frac{1}{2} \times 6\frac{1}{2}$, with rising front and elastic partition, for stereos for a magic lantern, with $4\frac{1}{2}$-inch condensers, and with or without lime jets.—Address, DAVID YOUNG, Park-view, Swinton, near Manchester.

Wanted, Burr's *carte-de-visite* lens, of $2\frac{3}{4}$ inches diameter, and $4\frac{1}{2}$ inches focus in exchange for Ross's No. 1 *carte-de-visite* lens, in good condition, Waterhouse stops complete. Trial required.—Address, S. ARLIDGE, photographer, Weedon, Northamptonshire.

I will exchange a new whole-plate portrait lens and square camera for a gold watch and Albert; also a whole-plate camera, and extra whole-plate camera and mahogany operating-room stand, and a first-rate portable dark tent, for any sort of jewellery.—Address, F. C. SWIGG, artist, 15, Henry-street, Plymouth, Devon.

The first and second volumes of the *Practical Magazine*, cost 30s., quite new and perfect (unbound), will be given for any of the following, or offers:—A really good bellows camera, half-plate (square); Howard's tent with camera stand; or first-class lantern slides.—Address, W. L. BREARE, Sun-lane, Burley-in-Wharfedale, *viâ* Leeds.

I will exchange a pair of gasometers made of zinc, nearly new, each holding about ten feet of gas, with gauge pipe and taps complete, together with oxy-hydrogen jet, retort, &c., for a cabinet lens by a good maker, or a doublet for half-plate pictures, or a good cabinet rolling press, or offers. Difference adjusted.—Address, R. CLENNETT, $25\frac{1}{2}$, Lynn-street, West Hartlepool.

ANSWERS TO CORRESPONDENTS.

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

THOS. JOHNSON.—Thanks. The process is a very excellent one.

INQUIRER.—The sample of green baize enclosed is too dark for a background.

*** Several articles and communications are unavoidably left over till next week.

F. R.—Please repeat your queries, writing more legibly, as we cannot decipher your letter.

CAPT. FOX.—Letter received. At the time of our going to press the negative has not reached us.

JOHN JONES.—Use Saxe paper for your engravings, and let it be only very thinly albumenised.

REV. B. S.—The Mr. Buxton referred to is the same gentleman who was in India some years ago.

G. V.—Make the solution much stronger. To each pint of the printing bath add at least one ounce more of silver.

R. BRIDGART.—Copies of Mr. M. Carey Lea's work may still be obtained from the Publisher of this Journal—price fourteen shillings.

J. C. F.—Artists have frequently acknowledged how much they were indebted to photography for obtaining more correct ideas as regards perspective.

P. INKSTER.—Nitrates and sulphates are so called when obtained by means of nitric and sulphuric acids; nitrites and sulphites being obtained from nitrous and sulphurous acids.

PERPLEXED.—The exposure is certainly very great, unless your lens is an unusually slow one. The studio seems sufficiently well constructed, but possibly the glass with which it is glazed may be of a non-actinic description. Test this point by removing one of the panes and subjecting it to a proper examination.

ROBERT GILFILLAN.—To test the lens for spherical aberration focus it on a small bright object, and then rack the lens both within and beyond the focus. If it be well corrected for photographic purposes the image will expand with a firmer image within the focus than it will at the same distance beyond it.

CHEMICUS.—The action of several oxidising agents on silver prints have been long ago carefully noted. Nitric acid acts energetically upon the image and dissolves it; chromic acid acts with even greater energy. Peroxide of hydrogen has a slow bleaching action, producing gradual fading, especially in conjunction with a slight excess of acetic acid, but permanganate of potash affects the picture with much greater rapidity.

A YOUNG PHOTO.—Our chief objections to the photograph are the foxiness of the tone and the conventionality of the posing. The lighting is good and the definition unexceptional.

THOMAS CROWTHER.—The graphogenic apparatus was described in our volume for 1871, at pages 179, 201, 212, and 495. In the first page indicated you will find a popular account of the instrument, and in the last the specification of the patent.

IGNORAMUS (Doncaster).—1. If you can obtain a copy of our ALMANAC for 1870 (which has long been "out of print") you will there find, in the course of a short series of chapters on enlarging, the precise kind of information you are desirous of obtaining. We are not aware of any other treatise on enlarging.—2. From your second query it is evident that you are not cognisant of the fact that any photograph may be copied on a larger as well as on a smaller scale than the original.

H. D.—1. A swing back, or its equivalent, is necessary in every camera to be used for photographing architectural subjects, more especially if wide-angle lenses are to be used. For cameras of large size it is also necessary, in order to get the foreground sharp.—2. The best description of instantaneous shutters are described in our ALMANAC for the current year, in which you will also find some observations upon swing-backs, their uses, and the substitutes that may be adopted for them.

CAPT. L.—1. We have not seen a Dubroni apparatus for several years, and hence cannot give you the information required. We recollect about nine years ago having had one—and a very small one it was—sent for examination and trial by the then agents for their sale, Messrs. Levi and Co. The conclusion at which we arrived, as the result of one or two trials, was that for certain purposes it might be useful, but that there would be great risk in the silver bath becoming disordered.—2. We have never worked with a "graphogenic apparatus," and do not know whether it is still in use or has been superseded by any of the very portable tents now in use.

FRANK W. M.—1. This correspondent has been trying to obtain enlargements by the following method:—He places a plain mirror outside of the window to reflect a beam of sunlight through a negative, passing on through a *carte* lens, until the enlarged image falls upon a sheet of ordinary sensitive paper placed upon an easel. Now, it is impossible that any image could be printed on paper of this kind, and under such circumstances, unless by an exposure extending over several days, because there is no condensation of the rays of light. To effect such condensation a condenser must be employed; and the larger the diameter of this condenser the more intense will be the illumination, and consequently the more rapidly will the printing be effected. A condenser suitable for this purpose will cost, we imagine, about four pounds without mounting. But if bromo-iodised paper be used instead of ordinary printing paper, the surface being excited by means of aceto-nitrate of silver, exposure to the light of the sky without either reflector or condenser will answer the purpose quite well. The exposure need not then be long, but the image must be developed by means of gallic acid.—2. No.—3. yes.

RECEIVED.—W. Child; Quandary; S. Guppy; Charles Waldack; A. Conti; J. S. S., and Mary B——.

INDECENT PHOTOGRAPHS.—At the Westminster Police Court, on Tuesday last, Mr. Superintendent Thomson, of the E division, who was accompanied by Mr. Collette, solicitor to the Society for the Suppression of Vice, stated that a few days previously the magistrate had granted a warrant to search the premises of Mr. Henry Hayler, of 61, Pimlico-road, and 20, Bloomfield-terrace, for indecent prints. The result had been the finding of 100,000 obscene photographs, 3,000 negatives of pictures of the same class, with a quantity of materials. The object of the present application was for a summons against Hayler to show cause why the things seized should not be destroyed.—The summons was granted.

METEOROLOGICAL REPORT,

For two Weeks ending April 8, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
26	30·43	SE	38	39	54	37	Dull
27	30·13	SSW	44	46	64	38	Fine
28	30·17	WNW	44	47	61	44	Fine
30	29·92	W	47	50	56	47	Fine
31	29·89	WSW	50	52	—	49	Rain
April.							
2	29·74	SW	51	54	57	47	Fine
4	29·52	S	41	44	55	39	Rain
6	29·76	WNW	39	41	58	37	Fine
7	30·07	NW	41	44	60	38	Fine
8	22·92	NW	44	47	53	42	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 728. Vol. XXI.—APRIL 17, 1874.

LONDON PHOTOGRAPHIC SOCIETY.

Another eventful meeting of this Society took place on Tuesday evening last. Varied as were the circumstances which then arose, we cannot but consider that the decision of the members will be of the greatest benefit to the Society. We confess that we looked forward with considerable anxiety to the proceedings of the evening. We pointed out in our last issue the extraordinary manner in which the re-elected President and some of his colleagues had deliberately set aside the conditions of their re-election, and how, in addition to other things, they had set the Society at defiance by ignoring the election of six of the members of Council. We waited with interest, therefore, to hear what possible justificatión, if any, could be offered for such an unwarrantable act.

It will be remembered that the President, Mr. Glaisher, was not present at the former meeting when he and his colleagues were re-elected. He commenced the proceedings last Tuesday by making a statement, which certainly was scarcely an accurate one, of what took place at the previous meeting. He seemed to assume that because he and those who resigned with him had been invited back by re-election they were exclusively to form the future Council of the Society. He utterly ignored the election of the others, and who were required to form the complete number of which the Council should be composed.

As a preliminary to taking the chair, Mr. Glaisher wished for this view of the case to be considered the accurate one by an immediate and unanimous vote of the Society. He would not be content with a mere majority, he said; for if there was even a minority against his proposition he would not accept the position. Before a vote was taken on the fundamental point at issue Mr. Glaisher was precisely informed of his apparent misconception. It was shown to him that the Society did distinctly wish him and his colleagues to return to office; but, as there might be a misunderstanding as to who were meant by "colleagues," it was shown the Society had voted that they should consist not only of those who resigned with him, but also of the six other members of the Council elected on the same occasion.

To this Mr. Glaisher positively objected. He said he would not sit at the same board with these six gentlemen. He bore testimony to their individual efficiency, and said that the thanks of the Society were due to them for conducting its affairs during the interval; but he persisted in his determination not to return to office unless the election of these six gentlemen was ignored, for he said he would not sit with them.

Mr. Glaisher was asked what objection he could have to the six gentlemen, seeing that three of the number had served with him at the Council-board on former occasions, and all were highly estimable and efficient members, one of them being a nominee of the old Council. It was further stated that the members had frequently been taunted with the fact that they had the selection of the members of the Council in their own hands, and that they need not accept the nominees of the Council unless they chose; that this year, therefore, for the first time in the existence of the Society, another list had been proposed and carried.

Then came the astounding statement, in all its objectionable force —a statement which decided the event of the evening—that, personally, he, the President, could have no objection to such estimable individuals, but he objected to their mode of election. They were elected by the members, and were not the nominees of the Council; therefore he would not sit with them.

The issue was, then, undisguisedly placed before the members:—Would they surrender their rights; would they give up the long-talked-of privilege they possessed of electing whom they pleased; would they turn their backs on those whom twice in two months they had elected; would they discard the gentlemen who had been the only means of holding the Society together when those in charge had deserted their posts? Would they do all this, and expose themselves and the Society as a laughing-stock to the world, and submit to the overbearing dictation of a President, allowing him to do as he pleased, not only disregardless of the wish of the members, but in utter defiance of that wish?

To this plain issue there could be but one answer, and this was given in the most emphatic and decided manner. The members would *not* consent to such arbitrary dictation; they would *not* forfeit their right of self-government; they would *not* turn their backs on those who had won their confidence; they would *not* sacrifice their honour and independence at the call of a despotic President. When the vote was placed before the meeting the members indignantly rejected it, and the President—this time in his *individual* capacity—tendered his resignation, which, unlike the action on the former occasion, was eagerly accepted without any expression of surprise or regret.

Such a scene we have never previously beheld, and one we hope never to witness again. How any man could have voluntarily placed himself in such an offensive and humiliating position we cannot imagine. It must also be remembered that, in addition to the obnoxious character of the measure the President had to propose, the manner in which it was done was arrogant in the extreme. It is no wonder, therefore, that, after such an exhibition of haughtiness and bad temper, Mr. Glaisher left the room accompanied with cries of "Oh!" and "shame!" So ended this memorable episode.

On the occasion of the previous conjuncture in February, when the President resigned, he was empowered to state that he took the rest of the Council with him. To the credit, be it said, of these other gentlemen he was not entrusted at the meeting on Tuesday last to do the same. This time it is evident that his colleagues, loyally as they have hitherto followed him, did not set their fellow-members at defiance, and he resigned individually. That Mr. Glaisher should have a small following is not a matter of surprise, and accordingly Mr. White, Mr. Mayland, and Mr. Pritchard (the Secretary) likewise resigned. Another member of the Council, Lord Lindsay, also left the meeting, but did not say he resigned; and, as it is believed that he did not endorse the action of the President, there is little doubt of his still remaining a member of the Council. One thing was distinctly remarked, namely, the conspicuous absence of many of the leading members of this body, particularly Captain Abney, Mr. Bedford, Mr. Blanchard, Mr. Dallmeyer, Mr. England, Mr. Robinson, and Mr. Simpson. So far these gentlemen have not endorsed the offensive act against their brother members, and we have no reason to suppose that they wish to be identified with it. We regret that the admirable photographer and worthy successor of the late Mr. T. R. Williams, Mr. Mayland, has chosen to cast in his lot with the President, as he possesses none of the objectionable qualities which for some time past have estranged the members from the late President. We also regret the loss—we hope only temporarily—of the able and energetic Secretary, Mr. Pritchard.

The breeze being over, the senior Vice-President, Mr. Spiller, was voted into the chair with applause, and the proceedings of the evening, in the ordinary sense, then commenced. The Chairman gave the members the assurance that, with the aid of his fellow-members of the Council (including the "*six*") and with the co-operation of the members generally—which he is sure to obtain—he would conduct the affairs of the Society. This statement was cordially accepted by the meeting, and the remainder of the proceedings, consisting of the reading of an interesting paper, followed by a discussion, concluded the business of this eventful evening.

We trust therefore that now, by the removal of the obstructing officers, combined with the fusion of the rest, based on the respectful recognition of the wishes of the members, and under the guidance of the experienced Vice-President, Mr. Spiller—than whom no one is more respected—harmony has at length been completely restored.

Mr. Spiller declared that the ordinary meetings of the Society should be devoted to the consideration of matters purely appertaining to the art; and that for the more formal business, such as the framing of the new laws and other purposes, special meetings would be convened. We urgently call on all the members to give their hearty support to Mr. Spiller in his important duties. They may feel assured that, from his able scientific abilities, his lengthened experience as Secretary and Vice-President, and from his known kindness of manner, they will have in that gentleman an accomplished leader. He won golden opinions from all by his conduct under trying circumstances on Tuesday night, and we feel certain that he will win many more in time to come.

PARAFFINE, AND ITS USES IN PHOTOGRAPHY.

Paraffine, the colourless, odourless, and beautiful substance with which we are all now so well acquainted—the solid hydrocarbon that was looked for by Liebig to supplant coal gas—has turned from a chemical curiosity into a household commodity. Can it be used in photography? Has it any application in that art which is dependent upon the magic of the sunbeam? Its very name suggests its application, if any. *Parum affinis* (without or beyond affinity) expresses the great chemical indifference of this curious substance. It is therefore, apparently, just the thing, from a chemical point of view, to act a part as a basis for rendering paper transparent—is, in fact, as inactive as a plate of glass itself. It has, however, some drawbacks as regards many of its probable applications.

Paraffine is a solid body, beautifully white, and of a crystalline nature, not unlike the well-known substance spermaceti in appearance. It is found associated with liquid hydrocarbons in the petroleums, or mineral oils, from wood tar, and the various native asphalts, including such substances as the now familiar ozokerite. But its great source is from the slow, destructive distillation of shale, lignite, and even peat, providing that the operation is carried on at a very low temperature. If the distillation be carried on at a high temperature the paraffine disappears from amongst the products of distillation; nor is it found in such substances as gas tar, in consequence of this fact—because the temperature of the retorts used in making illuminating gas is very high.

Why this paraffine so disappears concerns us, as we shall presently see. The paraffine of commerce is a colourless, translucent substance, perfectly inodorous and tasteless. It floats on water, and has a density of about ·870, and melts at about 45° to 65° C., forming a colourless oil which, on cooling, again solidifies into a crystalline mass. It boils at about 370°, and volatilises without decomposition. Paraffine does not absorb oxygen from the air, and is only slowly attacked by sulphuric acid, even at the boiling point of water. It is not at all attacked by dilute nitric acid, and only by the strong acid after prolonged boiling. In fact, chlorine or any of our most energetic chemicals but slowly act upon this curious substance, which may be considered to be as neutral to the general run of chemicals as our glass vessels. We have used a paper tray washed in paraffine for holding oil of vitriol in a drying apparatus.

Here, therefore, would appear to be a good material for rendering paper transparent. It has advantages over wax as regards its chemical neutrality, but does not seem to work well with collodion, owing to its solubility in ether. Wax is a more complicated product even when pure, and is an oxidable substance which, when first procured from the comb, is largely mixed with a yellow pigmenteous matter that has a great affinity for oxygen. It also retains a little of this substance when bleached, according to the amount of exposure to light it has received; so, accordingly as it is more or less bleached, so it is more or less changeable in its nature when exposed to the action of more oxygen and more light. Again: most of the chemicals with which wax is bleached artificially remain, and so impregnated is it that it will act with great energy upon metallic vessels if melted therein. Further: it is only by personal favour (in spite of the Adulteration Act and its analysts) that we can get pure wax at all, the substance sold as such being a compound made *secundem artem*, and from the private receipt of the manufacturer, with which the bees have had little to do. Wax is, therefore, a most uncertain compound to introduce into photography, and the other substances used in a similar manner are equally objectionable.

The great objection to paraffine is its strongly-marked crystalline nature and its want of pliability. As made for candles it is extremely hard, and breaks with a short, crystalline grain. But there have lately been brought forward some observations which greatly modify this objection. Paraffine was considered more of a generic term to express a number of hydrocarbons got from somewhat similar sources, and having a centesimal composition of eighty-five of carbon and fifteen of hydrogen, agreeing with marsh gas, with which it was supposed to be homologous.

One of the causes, however, for a doubt as regards the chemical individuality of paraffine was the fact that when procured from these various sources it had a different melting point; but lately it has been discovered that if a sample of paraffine be heated for some considerable time in a tube sealed up, the result is a more fusible paraffine, exactly similar in its apparent chemical composition, but much more soft and fusible—that, in fact, if the heat be continued for a considerable time, the paraffine being still under pressure, we obtain, ultimately, a liquid paraffine.

Scientific observations have only explained what the distiller of paraffine has known for some time, namely, that he cannot redistil that substance without lowering its fusing point. He looked upon this as one of his troubles, because as all the paraffine was wanted for candle-making it could not be too hard as a marketable article. Accidentally and occasionally the distiller used to get this soft and fusible variety, which has found a few applications in surgical appliances, such as dressings for wounds, &c.; and it is probable that its photographic applications may yet be of considerable value. Its advantages over the ordinary paraffine are its more pliable consistency and comparatively less crystalline character, as compared with our old acquaintance. It is also almost translucent. Mr. Field, the well-known paraffine maker, has stated in a recent lecture that a friend of his obtained a perfectly transparent paraffine by submitting it to heat under a pressure of four or five atmospheres.

We have instituted some experiments, and placed this paraffine in the hands of a practical photographer, so as to determine how far it might be used as a substitute for wax in a process similar to the waxed-paper process, or for producing transparencies, this latter bent being the most promising. If successful, we shall give formulæ for its use in a future article.

TINCTURE OF IODINE FOR IMPROVING NEGATIVES.

From a remark which fell from Mr. Frank Howard at the last meeting of the South London Photographic Society, relative to the method of applying tincture of iodine so as to remove a background or any other portion of a negative, we are led to infer that the best method of applying this substance may not be generally known.

We may premise that the action and object of an application of the iodine solution to a negative are the following:—When by means of a camel's-hair brush or otherwise it is applied to the image the atoms of metallic silver which formed the picture are acted upon by the iodine, and are converted into iodide of silver. Now, as metallic silver is not soluble in a weak solution of cyanide of potassium, but as iodide of silver is soluble, it follows that the application of this menstruum will instantly convert into clear glass every portion of a negative that has been touched by the tincture of iodine. Its use, then, will be obvious. Everything in a negative not desirable to be retained can be completely removed—a tree, a house, a background, a restless baby, or any other objectionable member of a group.

We have spoken of "tincture" of iodine. In point of fact, the iodine is used in the form of a *solution*. It may be difficult to define what a tincture really is. "Tinctures," says Cooley, "are solutions of the active principles of bodies, obtained by digesting them in alcohol more or less dilute." If we accept this definition, the so-called "tincture" of iodine is merely a *solution* of iodine in alcohol, and not a tincture at all. But without dwelling on the accuracy of the nomenclature we may at once say that the best form in which to use iodine for the purpose in question is the aqueous solution. This may be said to be another contradiction in terms; for if anyone attempt to dissolve iodine in water he will find that matters will not at all progress in a satisfactory manner, iodine being scarcely soluble in water, as seven thousand parts of water are required to dissolve one part of iodine.

Iodide dissolves very freely in alcohol, ether, chloroform, sulphide of carbon, petroleum, and in solutions of the iodides. It is the latter of these that we recommend as a solvent when the solution is to be employed in acting upon a negative. Drop a crystal of iodine into a little water and no visible change takes place, the water remaining clear as before; but on adding a crystal of iodide of potassium it will be found that, as soon as the latter has reached the bottom of the vessel, the iodine immediately becomes affected and dissolves readily, and the solution becomes of an intensely-deep red colour.

Mr. Howard's method of applying this solution to a negative is by means of a piece of blotting-paper cut to the size of the portion intended to be acted upon; for when applied by a brush he finds that there is a tendency to spread beyond the part touched, which expansion infallibly proves fatal, as every part so affected eventually becomes entirely denuded of the silver forming the image. But we find that if the iodine solution be thickened by the addition of a small quantity of mucilage of gum arabic—say a little more in proportion than is contained in common writing-ink—all tendency to spread is destroyed. The solution may be applied by means of a delicate hair pencil, and in the most minute specks, lines, or stipples; and, after the clearing-up application of the cyanide, these specks and touches will be found to be clear and sharply defined, showing that no extension has taken place.

A method of making compound or combination negatives based on the property of iodine of removing an image or a part of an image from a negative was described in our ALMANAC for 1871, and since that time we have operated upon many pictures with great success. The principle consists in first clearing away any desired portion of a negative by means of the wash first described, or by having a black background in the picture so as to produce clear glass in the negative; and then, having floated off the film from a second negative, which contains some figure or object that is to be introduced in the finished print, to attach it to the first one in its proper place. This is best effected by the aid of a flat dish of water, as it permits of the process of transfer being kept under complete control. When the under film is separated from the upper one by means of a varnish of india-rubber in sulphide of carbon, or, indeed, of any kind of varnish impervious to water, the iodine solution may be applied as freely to the upper or transferred film as it was to the lower one.

Many useful applications of the power thus conferred will suggest themselves to an intelligent photographer.

ALBUMEN AS A SUBSTRATUM.

THE use of albumen as a substratum has become so general, and seems by one consent to answer the purpose so well, that we were not a little surprised at the observations on this point in the concluding portion of the letter of our esteemed correspondent, Mr. M. Carey Lea, published in our number of April 3rd. Our correspondent is known to be such a careful experimentalist and accurate observer that we have thought it necessary to look somewhat closely into the subject, to institute an extensive series of experiments for ourselves, and also to ascertain, as far as possible, the opinions of a large number of professional photographers who, from practical experience, are able to form a correct judgment in the matter.

To twenty photographers, selected both for the extent of their practice and the high quality of their work, we put the following questions:—"Do you use a substratum of albumen? If so, what is the object you seek to attain by its use, and to what extent are you successful? Do you consider that the albumen has any effect on the character or appearance of the finished negative?"

To these queries three of the twenty replied that they had never used any substratum. Five stated that they did not use it in their ordinary work in the studio, but that they used dry plates in the execution of commissions for architectural or landscape pictures, and that in such cases their plates were invariably coated with albumen, which prevented the film from slipping; but, as they had never tried a plate without the substratum, they were not in a position to speak as to its effect on the quality of the negative, except that they and their *clientèle* were always pleased with the result. The remaining twelve reported, in substance, that for some years they had not wrought a plate without an albumen substratum, and that their object was—firstly, to secure that the plates should be chemically clean; and, secondly, that there should be entire freedom from liability of the film slipping. Both objects were in all cases fully attained. One of them added that until he introduced the use of substratum he could never get a clean plate unless he cleaned it himself, but that since its introduction he had never seen a dirty one, although his business is sufficiently large to employ thirteen assistants. Eight of the twelve had made some experiments with a view to discover any effect the substratum might have on the appearance or quality of the negative, but by the most careful observation had not been able to detect any difference between those taken with and those without it; while four expressed their belief that albumen tends to give a richness and delicacy to the deposit, and that it also affects its colour, making the silvery grey of the ordinary wet collodion approach more nearly to the yellowish-green of the collodio-albumen, and which, from its more non-actinic nature, gives better printing properties to the negative.

Our own experiments, which we may briefly describe, fully corroborate the opinions thus obtained. We first turned our attention to wet collodion; and some three dozen plates were marked on the back with a writing diamond, and coated to the extent of half their surface with solutions of albumen of various strengths, and of ages varying from one day to six months. We then selected a suitable test negative, evenly uniform as regards density and quality, and having arranged a suitable gas flame from a No. 2 burner, with a support for the printing-frame at a distance of twelve inches, we coated, sensitised, exposed, and developed two plates to ascertain the exact time of exposure required, which was found to be eight seconds. Fifteen of the prepared plates were then coated, sensitised, exposed, and developed in succession. The plates were well drained before being placed in the frame, and to guard against any effect from unequal draining, they were returned to the bath for a few seconds before development. In the same way we exposed and developed specimens of collodio-bromide, beer, and tannin plates; and, after the whole had been fixed and dried, they were very carefully examined, with the following results:—

The wet collodion plates which had been prepared with a rather horny collodion were perfectly uniform throughout, without a trace to indicate the portion to which the substratum had been applied; they were clear, clean, and vigorous, and full of the delicate detail essential to good lantern pictures. Those coated with a powdery collodion giving a porous film were somewhat different. On a close examination it was easy to see that one half of the plate was slightly better, both in colour and crispness, than the other; and a reference to the writing on the back showed that such half was the one to which the substratum had been applied. That this was not accidental was evident from the fact that every one of the powdery collodion plates was in the same state. The dry plates were next examined, and in every case the difference between the two halves was quite perceptible, and always in favour of the substratum.

From these experiments and opinions, then, we think we are fairly entitled to assume that an albumen substratum is not only not injurious but a real advantage—not only by ensuring clean plates and enabling the operator to wash freely without danger of loosening the films, but also, in certain cases, giving an image of better colour and finer quality. We believe, moreover, that this was only what might have been expected when we consider the part albumen plays generally in any dry process into which it enters; and we are certain our readers will bear us out in saying that, notwithstanding the many admirable processes which have been recently introduced, the very highest quality of dry-plate work will be found to have been the result of those into which albumen enters, such as the collodio-albumen, Fothergill, hot-water, beer, and albumen processes.

The only objection we have ever heard made against the use of albumen as a substratum is the supposed difficulty of applying it; but that is easily overcome, ammonia, if added in sufficient quantity, making it as limped and easily poured on and off as collodion. We generally take the white of one egg to twenty ounces of water, and add *half-an-ounce* of strong ammonia. For the first day or two it passes through the filter very slowly, and flows over the plate in narrow streams, instead of in an unbroken sheet; but, after standing for a week, it may be filtered as rapidly as water, and flows quite readily.

White of egg is not really albumen, but a solution of albumen (C_{72} H_{112} N_{18} SO_{22}) in an alkaline salt, or an albuminate of sodium with sodium chloride, and calcium phosphate contained in little cellules. Portions of these cellules pass through the filter and give to the solution its tendency to run in streams, as it does when the solution is fresh; but the ammonia seems to enter into union with and precipitate them, after which it becomes limpid, as already mentioned.

There seems at present a desire to remove the nitrates and other useless salts from emulsions; and, probably, the idea applied to albumen might very much increase its usefulness. The albumen may readily be converted into lead albuminate by lead acetate, the salts washed out, and a current of carbonic acid passed through, which would convert the lead into carbonate, and set the pure albumen free. We do not know whether this would be any real advantage; but we shall continue our experiments, and may return to the subject again. Meanwhile we hope our valued correspondent, Mr. Lea, will give an albumen substratum a further trial, as we are certain it is a valuable addition to both wet and dry collodion processes.

Some specimens exhibited by Mr. Spiller at the last meeting of the South London Photographic Society indicate in an admirable manner the great value of the aniline preparations as a means of converting plain glass into richly-coloured glass. We may first of all say that the specimens referred to are more brilliant than the great majority of vitrified coloured glasses hitherto produced—a fact which can be verified by any person who chooses to call at our office and inspect specimens of this description of glass staining. As respects transparency, they are so clear that the most distant object can be seen distinctly through them; while, so far as brilliancy of colour is concerned, they rival the most gorgeously-dyed silk. Their method of production, Mr. Spiller informs us, was very simple, consisting merely in collodionising a plate of glass, allowing it to set, and then rinsing, finally applying the preparation of aniline. When dry the plates are hard, transparent, and very brilliant. We strongly recommend those of our readers who have access to the aniline dyes to try this experiment. Glasses of this kind, we find, may be used, with excellent results, for producing effects of morning, noon, evening, summer, winter, or moonlight, according as the colours made use of are rose, yellow, orange, blue, or green. We need scarcely say that if objects in nature are inspected through a blue medium they will seem to have all the characteristics of winter scenes; while a green colour conveys the idea of moonlight, and a red that of a summer more or less hot in proportion as the colour is strong or attenuated. It is easy to see that dyes of this description may be applied to photographs as well as to glass. We are aware that delicate tints are applied to paper through the agency of aniline mixed with the albumen; but we believe that the desired tinting may be effected in a far more manageable way, namely, by immersing the finished prints in water containing a very minute proportion of whatever dye may be selected. We possess several prints which have been tinted in the way indicated after being finished, and the effect is really charming. But we shall have more to say upon this subject shortly, after we have made a systematic trial of several of the dyes of commerce. It need scarcely be added that one application of these dyes, and which, for utility, cannot be overrated, consists in the preparation of coloured glass for dark-room windows; and it is fortunate that the colour pronounced by Mr. Spiller as being the best for this purpose is quite permanent.

ON COLOURING MATTERS SUITABLE FOR TINTING FILMS.

[A communication to the South London Photographic Society.]

The practice of resorting to the use of colouring matters for overcoming certain defects in the operations of photography has of late years assumed much importance and served a good purpose, particularly in connection with the emulsion and dry-plate processes. Without a due recognition of the value of a pigment or "backing" the early results on dry plates were subject to the disadvantage of halation, arising from the blurring of the image on the collodion film by the secondary reflections from the posterior surface of the glass plate at the moment of its being exposed in the camera. These defects are chiefly observed when the preservatives employed are those which determine an unusual degree of transparency in the film; and with wet plates the same consequences follow the use of lightly-salted collodions. For a time burnt sienna mixed with gum and glycerine was universally resorted to as a pigment for backing the plates and correcting this tendency to abnormal reflections; but latterly this has given way to an adiactinic varnish, blackened paper, or carbon tissue at back, or a colouring matter applied sometimes to the face of the plate. Mr. Henry Cooper, Mr. R. Manners Gordon, and Colonel Stuart Wortley have worked in this direction, and advocated the system of tinting or staining the film, their experiences being recorded in the year books; Mr. Werge has likewise turned his attention to tinted transparencies; and Dr. Herman Vogel claims to have discovered an important and hitherto unsuspected function in the possibility of rendering bromide of silver sensitive to the so-called non-actinic rays, through the agency of aniline green and other coal-tar colours applied to the film as a supplementary wash. The whole subject is, therefore, one well worthy of investigation, and I need no apology for bringing the dyes themselves under your notice this evening, with such brief remarks and experience as I am enabled to give at the present time, chiefly from a chemical point of view.

My list of colouring matters includes rosaniline and its salts, crysaniline or phosphine yellow, aurine, Hofmann's violet, iodine green, and aniline blues of different qualities, prepared by Girard's and Nicholson's processes. We have thus a range of colours diversified almost as the solar spectrum, and capable of employment either directly as tinctorial agents, or serving more recondite physical purposes in screening back certain rays which otherwise would have their influence, in ordinary daylight, during exposure. The optical quality of the colours may be accurately determined by looking through the solution with a prism or spectroscope, and the area of absorption is at once apparent for all the visible rays. The reds and yellows cut off the most active and highly-refrangible rays, so that on this account they are employed by preference as antidotes in stopping halation with the dry-plate process. Of these colours I now proceed to give a more detailed description.

Rosaniline (*roseine or magenta*).—The salts of this base most frequently met with in commerce are the hydrochlorate and acetate, both being freely soluble in water. When a cold aqueous solution is required the acetate should be used. This can be procured in crystals or in the form of roseine cake—a fused mass of cantharides or brassy metallic lustre. Its tinctorial power is very considerable, so that a grain or two will redden a pint of collodion or dye an ounce skein of wool. When the hydrochlorate of rosaniline is mixed in solution with nitrate of silver a pale pink precipitate is formed, consisting of chloride of silver in intimate combination with the rosaniline. This is very rapidly affected by light; for the organic base aids in the reduction of the silver salt, and appears to absorb the chlorine liberated. The life-sized heads shown at the last exhibition by Colonel Stuart Wortley were, no doubt, examples of tinted photographs produced by immersion of the finished prints in a weak solution of rosaniline. If their colour be deemed too strongly marked it is easy to moderate the action by the use of a more diluted solution; but the character and effect produced may be judged from the pictures. A short notice of this and other applications of magenta appeared in the *Year-Book of Photography* for 1869 (p. 38), and as one of the "practical suggestions" I pointed attention to the possibility of imparting a warmer colour to over-toned proofs in this manner. Mr. Henry Cooper has recently described a mode of using rosaniline in collodion which is said to be without any detrimental effect upon the bath—in consequence, doubtless, of the before-mentioned affinity for the silver iodide, if not for the pyroxyline itself.

Crysaniline (*phosphine yellow*).—This body occurs in commerce in the form of a deep orange powder, which is freely soluble in hot water. It likewise combines with chloride of silver, giving it a yellow tinge, and an aqueous solution of phosphine stains the collodion film of the same colour. Alcoholic solutions may be employed in cases where water cannot be used. Albumen is easily tinted by it, but the colour is not one that would be desired.

Aurine is met with in the form of a resinous cake which is quite insoluble in water, but is taken up by ammonia, forming a deep rose-coloured solution which does not dye well. It is freely soluble in warm alcohol, and by admixture with a little shellac gives a very good non-actinic varnish of permanent character. Mr. R. M. Gordon has used aurine in collodion, and reported very highly of it as an agent for preventing halation. Used as a dye upon silk the colour is a magnificent golden yellow. It has no affinity for cotton; but with certain mordants gives a bright scarlet on wool.

Hofman's Violet (*ethylated rosaniline*).—This colour may be had in several shades, varying from the reddest violet to purple. In general properties it closely resembles rosaniline, and is freely soluble in alcohol and water, the solution staining collodion, albumen, and animal fibres. Examined by the spectroscope, it appears to be transparent to all the upper visible rays, but, nevertheless, somewhat impedes the action of light in the camera.

Aniline Green (*iodine green*).—The latter name, by which it is commonly known, has been conferred upon it in consequence of its containing iodine as a necessary element. This, driven out by heat, destroys the compound, with reproduction of the original violet from which it is made by Hofmann's process. The aqueous solution cannot be boiled without injury to the colour; but a warm infusion serves to dye collodion or silk, and reference has been made to Dr. Vogel's recent experiments with this colour. It is freely soluble in alcohol, and may be obtained in splendid crystals of a dark bronze appearance. It is generally met with in the form of a dark green powder, which contains a little common salt, used in separating the colour from admixture of violet.

Aniline Blue (phenylated rosaniline).—"*Bleu de Lyon*" was first prepared by Girard, by the action of aniline upon magenta or aniline red. This body is not soluble in water, but becomes so by treatment with oil of vitriol, according to Nicholson's process. Many improvements have been introduced by which the colour is fitted for various purposes. Opal blue is used for dyeing silk of the finest shades; Nicholson's blue goes well upon wool; and soluble blue is used for cotton. The first of these is, like the "*bleu de Lyon*," quite insoluble in water, but is taken up by warm alcohol, forming a magnificent blue solution, which cuts off all the yellow, and much of the lower portion of the spectrum. Nicholson's blue is an alkaline preparation, freely soluble in water, but of minor interest for our present purposes, since it requires an acid for development. The soluble blue is prepared of several qualities, and one of this series—named China blue—has been made the subject of experiment, by Mr. William Brooks and myself, for tinting films of a bright blue colour. The aqueous solution dries to a structureless mass, which led me to try its employment as a preservative in the collodion process. My first attempts were made last summer with solutions of unknown strength; but Mr. Brooks has recently gone over the same ground in a more exact manner, using solutions containing respectively twenty and forty grains per ounce of water, and applying directly to the washed sensitised plate (bromo-iodised collodion), washing off the excess of dye in some instances, and at other times leaving it on to dry. In every case the exposure had to be very considerably prolonged, in order to get fair negatives with a gelatino-iron developer, and there was a difficulty in seeing through the plate for the purpose of watching the development. Methylated spirit afterwards removed the blue from the film; but, if left in, this colour did not offer any practical obstruction in the printing. Working with three and five-grain solutions of the China blue, the diminution in sensitiveness was very marked, so that there is little prospect of being able to take advantage of this neutral blue in the preparation of dry plates, unless, indeed, a retarding influence, in special cases—as in photographing the sun—is particularly desired. John Spiller, F.C.S.

[Specimens of the various colouring matters, and of the fabrics and collodion films dyed with them, were exhibited. The effect of heat upon iodine green, in changing the colour to violet, was likewise shown.]

NOTES ON THE FADING OF PORCELAIN PICTURES.

On coming across an old note-book of mine, in which some remarks were jotted down during the course of some experiments with the collodio-chloride process on opal glass, I thought a few remarks gleaned from these notes might be of service to those of your readers who may still be practising this charming yet, judging from many of our fraternity's exhibitions, neglected process.

The point upon which I intend particularly to draw attention is that of the fading of this style of picture; for if any means of rendering permanent any of our productions are hit upon the knowledge of them conveyed to others may be acceptably received. But in these days of search after sensational processes, in which there may or may not be any originality, it is hard to say whether or not photographers are a class of beings who do not believe in the value of anything unless they have to pay considerably more for it than the price of a number of this Journal. As an instance of the absence of information (which I hope is rare) which photographic literature is intended to obviate, I may mention the case of a photographer buying as a secret process the one now under discussion, and that very recently too.

The sources of fading in this process are not very apparent, for in it no other materials are used than those by which our negatives are produced. As to the permanency of these there is but little dispute, for the substitution of the chloride for the iodide and bromide of silver can have no such action; therefore, for all purposes they may be looked upon as identical in principle, and any source of fading may be classed under two heads, viz., when the fading is such as may take place in any negative, but so slight as to escape observation; and, on the second count, to such as is due to some materials used in the one not generally employed in the other.

Attention may first be drawn to the employment of a substratum of albumen, which is used in both this and the negative process. That this is a source of fading with the collodio-chloride has been pointed out before, yet collodio-albumen negatives have proved to be as permanent as any in my experience. It may, therefore, be predicted that negatives in which the albumen substratum is employed will not sensibly deteriorate, but the difference between a positive viewed by reflected and a negative used by transmitted light is at once apparent; for a very slight yellow tinge in the latter would have no injurious action, but in the former would at once destroy the purity of the whites, and hence destroy the picture. No matter how the use of albumen aids in the production of a warm, velvety tone, and keeps the picture on the plate, it will be wise to avoid it.

Another source of fading is one which I never expected to find, and quite took me by surprise. A sheet of opal glass was coated with ordinary varnish—a good and, practically, colourless sample. Part of the plate, after coating, was covered with an opaque material and then exposed to the sunshine for a week. On examination the exposed portion was sensibly of a yellowish colour, and when the varnish was dissolved off with alcohol the plate had again its pure white surface. As the varnish had been in use for negatives it was thought possible that it might have become contaminated with something washed off the negatives. To test this a fresh bottle was opened and the experiment repeated, with the same result. Some samples of varnish show this in a lesser degree than others, and one that was used maintained its transparency altogether. The experiment is so easy of execution that it would look like advertising the wares of others to mention any names. Some pretty effects may be obtained by adding to the varnish some colouring material that is soluble in alcohol; the yellowness may then be neutralised, and a warm bloom given to the white.

The use of hypo. as a fixing agent was found to be a source of fading. It may be fancied that proper precautions were not adopted to eliminate this body; yet, when the modes of washing employed are described, few, it is apprehended, will be of that opinion. The pictures were washed in running water for twenty-four hours; others were suspended so as to be just below the surface of the water contained in a vessel which had a fresh supply of water every quarter of an hour, the pictures being well drained between each change, and having about twelve changes. Still, an exposure to the sun caused a deterioration of the whites; and, more strange yet, when the collodion film was dissolved off a yellow stain was left on the parts that had been exposed to the light which only nitric acid would remove. It was thought that this source of trouble could not be removed, until ammonia as a fixing agent was tried, and, with the most severe tests, no fading was found. The plates were immersed in a dish of ammonia fort. instead of the usual hypo., washed for a short time, and a permanent picture was the result. I have a picture so treated before me now that has been in parts exposed to all the changes of light incidental to six months of our summer light, and no difference can be detected between the exposed and unexposed portions.

Opal pictures, from their style, require but little pushing on the part of the photographer to ensure the sale of an article that pays well. They have a beauty peculiarly their own, and meet a want that I know of no other means of supplying; and if what has been written has any tendency to revive a taste on the part of photographers for these pictures, when permanency can be assured, its end will be accomplished. W. E. Batho.

GERMAN CORRESPONDENCE.

New and Successful Method of Reproducing Negatives.—Chloride, Bromide, and Iodide of Silver in Wet and Dry Plates.—On Difference in the Sensitiveness of Collodion Films.

Today I have to report some news of great importance which is of interest not only to Germany but to the whole photographic fraternity. It is a method of reproducing negatives. You will say this is nothing new. That may be. We have had reproduced negatives for a long time, and when we read the reports of the papers we are lead to believe that the matter is very easy; but if we ourselves try it practically we may get a tolerably good negative, but it does not bear comparison with the original either in softness, half-tone, or harmony. If from a negative a positive is made by the camera, or by Edwards's albumen plates, a part of the fineness is generally sacrificed, or if anything comes out sharp and clear the positive will not have the same proportions of light and shade as the negative, and this deviation will increase when we take a negative from the reproduced positive; in fact, in most cases the negative so obtained cannot stand comparison with the original. The want of an easy method of reproducing negatives is felt the more as our negatives are the most fragile part of the photographic household, and if one breaks it is, in most cases, not the worst but one of the best and finest.

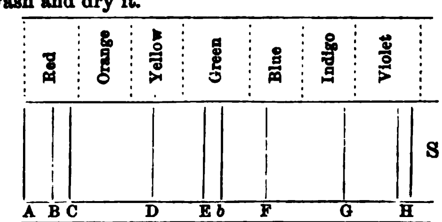
It is with pain that I think of some broken plates from Aden, Egypt, and the summits of the Carpathian Mountains, which, unfortunately, can never be replaced. Under all these circumstances judge of my surprise on receiving, about two weeks ago, a box from M. Obernetter, in Munich, containing a number of original negatives, and also reproductions of the same. The reproductions were of a peculiar blackish-grey colour, and at first sight the copies appeared thinner than the originals. At first I had my doubts, but I soon found out that prints made from the copies did not vary from those taken from the originals. Generally the prints from the reproduced negative were more brilliant; they showed deeper shadows and brighter lights. But this rather appeared to be an advantage. In regard to clearness, purity, and softness they left nothing to be desired. Obernetter has handed his process to the Vienna Photographic Society and received the gold medal for it. The process in itself is not new, but in its execution it varies from all the other methods. Obernetter does not require a diapositive to make a negative, but he simply obtains the negative direct and in one operation by the so-called "dust process." This process, which heretofore has only been used for making burnt-in photographs, consists in the employment of a film of gum arabic, which is sensitised with chromate of potash. Such a film is slightly sticky, so much that a pigment powder will adhere to it. This stickiness is lost by exposure to light. If such a plate is exposed to the light which passes through a negative those places only will remain sticky which are covered by the dense parts of the negative, while the others lose it. If the plate, after having been exposed, is dusted over with a powder the latter will only adhere to those parts which were covered by the dense parts of the negative. We obtain in this manner, by a single operation, a negative. Obernetter has not published his results yet, but they will be printed very soon. In the meantime I myself have made experiments in this direction. I coated a glass plate with the following solution:—

Gum arabic	6	parts.
Chromate of potash	2·5	,,
Grape sugar	4	,,
Water	72	,,

The film is dried in the dark at a temperature of about 90° to 100° Fahrenheit. I placed a negative plate on the film and exposed with the photometer to fifteen degrees. On the plate there appears a feeble image. When the film had been exposed for a short time to a damp atmosphere I dusted English red over it, and obtained, in fact, a negative. The dusting has to be repeated several times, and the excess of colour has to be removed with a soft brush. The negative which is obtained in this manner is reversed in position when compared with the original. When we wish to have it in the same position as the original we have to lift the film. For this purpose plain collodion is poured over it, and the plate is placed in acidulated water (one part of sulphuric acid, 100 water); this removes the film with the picture. The film after being washed is placed in the correct position on a plate of glass. It seems as if in this way only perfectly plain surfaces could be covered with the negative film; this, however, is not the case, for Obernetter copies curved negatives also by placing a gum gelatine film on mica.

Astonishment has frequently been expressed that Obernetter is able to make light prints from ordinary negatives which are not reversed in position. Now the secret is out. Obernetter makes by the above-mentioned process a reversed negative, and makes from it the light print. He has practised this process for years, and writes himself:—"Two-thirds of all the work done at my *atelier* I would have been unable to do if I had not had this process—beginning with the war pictures of 1870 to the pictures of the Vienna Exposition in 1873." Recently Obernetter has reproduced plates of sixty centimetres in size. He reproduces also negatives for the profession, and charges, for instance, for a stereoscopic negative $2 in currency. In three or four weeks I expect to receive the full particulars of this process, when I will communicate further details to you.

In the meantime I have continued my experiments in spectral analysis, and have made very curious observations which will very materially modify all our former ideas about the sensitiveness of the photographic film. Heretofore experiments have generally been made with wet plates. For instance, most of the photographic spectral experiments were made with wet plates, and the results have rather rashly been applied to dry plates also; this has led to many errors. The behaviour of the photographic film in relation to colour becomes completely changed when we wash and dry it.



According to the experiments of Schultz-Sellack, wet chloride of silver (under nitrate of silver) is sensitive only to the extreme violet rays, near to the line H (see diagram), while the other visible colours exert hardly any influence. The dry chloride of silver, according to my experiments, behaves quite different; it is about two and a-half times less sensitive than bromide of silver, but with a sufficient exposure it is affected by almost all the colours of the spectrum. With chloride of silver I obtained a picture of the spectrum which extended to the line B, in red (see diagram). The effect on bromide of silver is also modified by the state in which it is submitted to the light, whether dry or wet, as I have mentioned already in a previous letter; but I noticed this most strikingly with iodide of silver. When exposed wet it yields a picture of the spectrum extending from ultra-violet to a little beyond G, where it suddenly stops.

When exposed dry the sensitiveness extends much farther, even into the green, where it suddenly decreases, but continues into the red beyond the line B (see diagram). These observations explain many phenomena of dry-plate photography. It has often been asserted that dry plates prepared with iodide of silver only yield pictures as soft as those made with wet bromo-iodide of silver plates. Krone has recently stated the same, and expresses the opinion that the resin which he adds to his dry plates affects the plates in the same way in which bromide of silver acts in the wet process. We do not need, however, such an hypothesis, for the sensitiveness of iodide of silver in the dry state is totally different from that in the wet state; its behaviour when dry corresponds almost completely with a wet bromo-iodide plate, only that the latter works much more rapidly.

After such discoveries it cannot surprise us that a washed and dried bromo-iodide of silver plate is affected differently from a wet one; it is less sensitive for violet, but with long exposure it shows greater sensitiveness for green.

Numerous investigations are necessary to modify our former views about the sensitiveness of photographic plates, and particularly to bring a clearer understanding in the dry-plate question.

I have to add a few words about what is called sensitiveness. When we take two kinds of collodion from two different sources, and make a portrait with either of them, one of them may perhaps yield a much more detailed picture, at ten seconds' exposure, than the other. Everybody will pronounce the former more sensitive than the latter; but if we make several trials with the two collodions, and vary the time of exposure, we obtain a different result. I had two kinds of collodion which I tested in the following manner:—With each one I made a triple *carte-de-visite* plate; the first plate was exposed for ten seconds, the second for twenty, and the third for thirty seconds.

A comparison of the two pictures, which had each been exposed for ten seconds, showed collodion number one decidedly more sensitive than the other. The two pictures of twenty seconds each furnished a like result; while the two of thirty seconds were exactly alike in detail. Collodion number two was, therefore, with such an exposure, fully as sensitive as number one.

Something similar I have noticed when exposing plates to the spectrum. With a short exposure iodide of silver is much more sensitive than bromide of silver. With long exposure bromide of silver is much more sensitive for the red and yellow colours than iodide of silver. The practical photographer understands by sensitiveness the ability to yield a detailed picture with a very short exposure. The sensitiveness with long exposure is an entirely different matter.

For my landscape photographs I prefer a slow collodion—one which with long exposure gives fine details. I prefer this to the sensitive ones, which work rapidly but give over-exposed lights.—Dr. Vogel, in *Phil. Phot.*

THE PHOTOGRAPHIC TEST APPLIED TO THE TICHBORNE CASE.

A pamphlet has been issued entitled "*Tichborne or Orton? the 'Crucial Test' Tested.* By B.A., LL.D. Being a Review of the Photographic Test suggested in a Recent Pamphlet for Use in Cases of Disputed Identity;" and, in reviewing this pamphlet and the subject, the *Morning Advertiser*, which has throughout taken a very friendly view of the Claimant's case, makes the following observations:—

There is a scarcely-suspected danger in absolute reliance upon photography as a means of identification. The obvious value of a sun picture as a means of recognising and verifying individuals, and the unprejudiced trustworthiness of a "mirror with a memory," as the photograph has been phrased, may easily lead to obliviousness of the limits of that trustworthiness and to the conditions which surround it. Photography, with a natural inclination to the truth, can be made to lie. A frame of twenty portraits exhibited some time ago by a Berlin artist strikingly illustrated this. The head was that of a pretty girl photographed under twenty varying conditions of light, position, *entourage*, and expression, giving a presentation of twenty different persons, of whom at least half appeared so diverse in every way from each other that it would have been impossible to identify them as portraits of the same person. The camera was truthful in recording that which was presented to it, but the varied conditions presented entirely different images to the lens, which hence produced entirely different pictures. Either sinister design or accidental conditions may so mar the accuracy of the autotypic presentment of the camera that recognition may be rendered difficult and doubtful, and absolute identification impossible. But whilst modifications in the light and shadow, the expression, and the "make-up" may thus militate against familiar likeness, and mar anything like aids to recognition, there are certain other qualities inherent in the photograph which remain unchanged in varying conditions, and are of importance, in conjunction with other evidence, in establishing identity. The expression of a face may vary, but its contour will remain the same. The eye may be made light or dark in the photograph at the will of the photographer; but the shape of the eye, the size, the position, the character of the eyebrow will, unless fraudulently modified, within certain limits retain the same character in all photographs of the same face. So with the ears, nose, mouth, and chin; whilst easily capable of modification in detail sufficient to destroy familiar likeness, they will retain certain specific elements of form, size, and proportion, which, on submission to suitable tests, possess almost overwhelming weight in establishing or disproving identity.

Viewed in this aspect, the pamphlet just issued on the application of the photographic test to the Claimant to the Tichborne estates possesses an especial interest. During the course of the late trial one of the many amateur and volunteer advocates for the prosecution, an artist, prepared a series of drawings from the Chili daguerreotypes of Roger Tichborne, consisting of eyes, ears, and other features, on the scale of life, with similar drawings for comparison of recent portraits of the *soi-disant* Roger then under trial. These drawings, with explanatory text, were intended for publication, the professed aim being the recommendation of the use of photography as a crucial test in cases of disputed identity. The especial object of the drawings was to illustrate dissimilarities between the features of the daguerreotypes of the undoubted Roger and those of the Claimant. Produced by an artist whose skill was not inferior to his manifest bias against Dr. Kenealey's client, these drawings formed a practical argument of no mean order for the prosecution, and the artist, knowing their tendency, evidently had no fear of committal for contempt before his eyes in taking steps for their publication. The legal advisers for the defence took steps in time to prevent actual publication; but to what extent the drawings went into private circulation, and what influence they had on the final result, it is impossible to say. The writer of the pamphlet just issued having seen the drawings arrived at the conviction that the legitimate conclusion to be deduced from an honest and discriminating comparison of all the points in the portraits was irresistibly in favour of the Claimant, the cardinal qualities of the face in all the portraits being essentially the same, the variations to be found being not only such as might be produced by the various modifying conditions, but such as are the legitimate result of the known modifying circumstances in operation. The state of terror produced by the unprecedented committals for contempt of Court—terrible whether strictly within the sanction of the English law and Constitution or not—having now subsided, the writer of the present pamphlet issues it as having an interest on the general question of tests for disputed identity, as well as on the Tichborne inquiry, which, as a question of abstract justice, must continue to possess public interest, although it may have no influence on the fate of the Claimant.

The chief value of the pamphlet consists in the completeness of the illustrations which present the whole of the Claimant's features in detail for comparison with the same features in detail taken from the Chilian daguerreotypes, and sagacious comments thereon pointing out similarities and dissimilarities, with their bearing on the question of identity. In relation to the ears, for example, the pendent lobe, which, as compared with the Chilian portrait, was a strong point with the recent prosecution, the similarity of form and measurement in the general structure are shown beyond a question, the pendent lobe alone forming a point of variation. As explanatory of the latter fact we find that the late Dr. Conolly, of Hanwell, and Dr. Foville, of Charenton, agree in indicating this pendulosity as one of the results of brain disorder, arising from sunstroke and other of the vicissitudes to which the Claimant has beyond a question been subject. Other features examined in detail afford similar argument, and demonstrate that if the refusal to admit the defendant's claims to the Tichborne baronetcy rest on no better grounds than the alleged dissimilarity *au fond* between himself and the Roger Tichborne whose Chilian daguerreotypes remained the only tangible aids to his identification, then the unfortunate Claimant, who has just commenced a term of imprisonment from which it is probable death alone will release him, is the victim of terrible misfortune, if not absolute injustice.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on Tuesday last, the 14th inst., at 9, Conduit-street. There was a full attendance of members.

Mr. Glaisher (standing in the vicinity of the chair) said that when he left that room a few weeks ago it was with the firm resolve of never returning. To the position of President he had never aspired, for he found it a very exacting one, taking up a great deal of his time, which was valuable; and when circumstances arose which caused him to leave he did so with the intention of not again returning to the office. But it had been represented to him that it would be for the good of the Society that he should return for a short time to resume the position of President. It had also been reported to him that it was their unanimous wish that the Council should return to conduct the affairs of the Society. Knowing well that councillors were not made in a day, he acceded when the conditions were accepted, namely, that they should constitute the Council; and, in reply to the request of the out-going Council—to whom they owed their thanks for carrying on the business of the Society in the meantime, and who had tendered their resignations—stated that they accepted for a time the position they had previously occupied. He scarcely knew his own position, which was an anomalous one; but he might say that if the meeting was unanimously in favour of the return of himself and his colleagues they would comply and act for the welfare of the Society as far as they could. Before he took the chair, therefore, he wished to know if it was their unanimous wish that he should return to act as their President. If after what had occurred he had been called upon to advise another person in this matter he would have said "do not go back;" but, as he did not desire to do things by halves, he was willing to go back.

On the question whether the members were desirous that he should occupy the chair as President of the Society being put to the meeting, it was carried unanimously.

Mr. Glaisher said that it only remained for him to say that, on behalf of himself and his colleagues, he accepted the position in which he and they had been replaced.

After an expression of approval of this decision by a gentleman whose name did not transpire,

Mr. Jabez Hughes said he gathered from Mr. Glaisher's remarks that he could scarcely have been very correctly informed as to what had taken place at the previous meeting. They did most distinctly re-elect himself and his colleagues, and were much pleased at having the opportunity of doing so, and when they were then asked if they wished to retain Mr. Glaisher's services as President, he (Mr. Hughes) could answer for the Society by saying that they did. With respect to his colleagues, there was involved something about which there might be some difference of opinion. The members would like to know who Mr. Glaisher meant by his colleagues, and it was important that they should be informed who were the members constituting the Council.

Certain gentlemen who had served on the previous Council, and who had resigned, had been re-elected, and with them six other gentlemen were elected to fill the vacancies in the last Council. These had been elected at the February meeting. He wished to know whether the six gentlemen nominated by the Society and duly elected were recognised by Mr. Glaisher as his colleagues.

Mr. GLAISHER said he was very glad that he had not taken the chair. In saying that he would not act with those six gentlemen he wished it to be understood that it was not on account of their names; but they must imagine that he was wanting in feeling if he could do so, when they were intended to supplant other gentlemen who had been selected and nominated by the Council as eminently qualified for filling the vacant offices.

Colonel STUART WORTLEY, on behalf of the independent members, objected to their being handed over from one party to another.

Mr. GLAISHER said that if the conditions laid down by himself and colleagues were not accepted he could not take the chair.

Mr. HUGHES was desirous of knowing the reason why the six gentlemen elected by the Society had been ignored by Mr. Glaisher. They (the members) had been taunted with the fact that year after year they had never proposed any opposition list to that put forward by the Council themselves, and had been blamed because they had not done so if they felt such a course desirable; and now that once in the history of the Society they had done so——

Mr. GLAISHER (interrupting) said that the remarks made by Mr. Hughes showed that there was not unanimity in the request that he and his colleagues should return.

Mr. HUGHES: The decision of the meeting was that you——

Mr. GLAISHER: I decline to enter into discussion, and I shall not act with the six gentlemen you have elected. (Loud cries of "shame! shame!" and hisses.)

Mr. Glaisher, observing that he was leaving the Society for ever, then retired from the room, accompanied by Lord Lindsay, Mr. White, and Mr. Mayland—the only members of the Council who responded to his request that they should follow the same course.

Colonel WORTLEY proposed, and Mr. SAMUEL FRY seconded, a motion that Mr. Spiller, the senior Vice-President, should occupy the chair. This being unanimously approved of,

Mr. SPILLER took the chair. He said that he had been called to that position at a very awkward moment, and he would earnestly beg of the meeting to consider whether conciliatory measures might not yet be adopted. (Cries of "no! no!") The next few minutes would, he felt, decide the future of the Society. Mr. Glaisher had rendered good service to the Society, from which he had then been driven out (a voice —"Led out by others"), and he would like to take the sense of the meeting with respect to it.

Mr. W. S. BIRD said that there had been a great deal of thunder in the air; but the fact was that among the members there was simply a desire for a little reform. It was felt that there should be a variation in the constitution of the Council, and a greater rotation of office. It was further believed that Mr. Glaisher was the best man to place or retain in the office of President; but, in a matter affecting the revision of the laws, he had not expected from Mr. Glaisher such a feeling of acerbity. They must not forget that it was a constitutional question, and if Mr. Glaisher came and said that he would not act constitutionally they must take a stand accordingly. While he felt that Mr. Glaisher would be a loss, he still believed that his place could be filled.

Mr. F. W. HART said that Mr. Glaisher had that evening put it on record that the members having placed an opposition list of nominees for election on the Council against that proposed by the Council themselves he would oppose it as an act of antagonism. Much as he would otherwise have desired to see that gentleman occupying the chair, he would have to decline voting for his return.

Mr. G. HOOPER reminded the members that at the previous meeting he had stated that the interests of the Society were paramount to those of individuals, whether President, Vice-President, or members of Council. He hoped that their interests would not suffer by the loss of their President, who had done much good to the Society. If he declined to return it was their part to do that which was for the benefit of the Society.

Mr. BADEN PRITCHARD (who, when Mr. Glaisher left the room, had resigned the secretaryship, but who, at the request of the meeting, resumed the office as acting-secretary) then read the minutes of the previous meeting.

Colonel WORTLEY took objection to the minutes on the grounds of inaccuracy. When Mr. Hooper read his motion, to the effect that the members of Council be requested to resume office, he (Colonel Wortley) had taken the precaution of asking Mr. Hooper to read the names of the individuals who were to be invited back, so that there might be no mistake about them, and unless that were specified in the minutes they were not correct. Certain other gentlemen were elected in addition to those named by Mr. Hooper on that occasion, and he (Colonel Wortley) would take the opportunity of asking one of them, Mr. Goslett, how it occurred that no journal had been issued since the former meeting.

Mr. GOSLETT explained that, although he and five others had been elected by the Society as members of the Council, their election had been entirely ignored by Mr. Glaisher, seeing that not one of them had been invited to attend any of the meetings of the Council. He therefore was unable to answer the question put by Colonel Wortley.

Mr. F. HOWARD complained that, while a portion of the correspondence he had had with the late officials of the Society had been published, an important letter had been omitted.

Mr. HOOPER said that his motion was read and put to the meeting from a printed copy, which had been literally copied into the minutes just read.

Mr. HOWARD said that both Colonel Wortley and Mr. Hooper were right, the motion having been read from the printed copy; but the explanation as to the individuals to be elected had also been made.

After some other remarks the minutes were signed as being correct.

The CHAIRMAN considered it necessary to take stock of their position, and he would call a special meeting for the purpose of placing the Society upon a firm basis so as to carry on the business for the year before them. He thought they might fairly trust him, as the senior officer of the Society, to call them together for that purpose on the earliest possible occasion. (Applause.)

Mr. HUGHES said that they could not do better than leave the matter in the hands of the present Chairman, and hoped that he would not forget the urgency which existed for improving and adopting the suggested new code of laws. Seeing that Mr. Spiller was the seconder of the resolution to re-elect the six members referred to, he had no doubt that in future meetings of the Council those gentlemen would be found in the place in which it was desired to see them.

The CHAIRMAN observed that he was not responsible as regarded the non-summoning of those gentlemen to attend the meetings of the Council; but for the future, so long as it was in his power to do so, he would guarantee that no members of the Council would be overlooked.

A MEMBER having expressed a fear that the business of the Society could not be carried on efficiently, owing to the resignations that evening,

Mr. HOOPER said that at the last meeting eighteen members of Council were elected, and of these only three resigned, if they really had done so. That still left a body of fifteen, out of which a very good quorum might be obtained.

After some observations by Mr. Spencer, Mr. Stillman, and the Chairman, the subject dropped.

The ACTING-SECRETARY then read a paper, *On Printing and Toning Collodio-Chloride of Silver Pictures*, by Mr. George Bruce, of Dunse. [This paper, and also the discussion which ensued, will be given in our next number.]

After a vote of thanks to Mr. Spiller for the able manner in which he had conducted the business of the evening, the meeting was adjourned at an unusually late hour.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Thursday, the 9th inst., at the House of the Society of Arts,—the Rev. F. F. Statham, M.A., President, in the chair.

After the minutes of the previous meeting had been read and confirmed.

Mr. J. Spiller, F.C.S., read a paper *On Colouring Matters Suitable for Tinting Films*. [See page 182.] Specimens of the various preparations of aniline mentioned by Mr. Spiller were exhibited, together with objects dyed by their agency. Among these were collodionised glass plates in a variety of colours.

The CHAIRMAN considered that the subject was one of great importance. Referring to the experiment of Dr. Vogel he inquired if the same effect of practically increasing the sensitiveness of the yellow rays could not be produced by the interposition of a coloured film in front of the sensitive plate.

Mr. SPILLER thought that when the colouring matter was in contact with the chemicals a different effect would be produced than when it was applied in the way indicated by the Chairman.

Mr. BROOK had experimented with blue films. He first of all exposed a wet collodion plate to ascertain the exact time required, and he then gave exactly double that exposure to a blue-stained film, but could not develope a visible image. On attempting to clear the film with cyanide of potassium a very faint positive image appeared, and the experiment was repeated with the same result. He suggested that aniline might possibly be used as a restraining agent.

Mr. SPILLER observed that cyanide had a curious effect upon a coloured film. He then showed the effect which heat had upon a sheet of paper that had been dyed with iodine-green, by moving a lighted match underneath it. The heat converted the green into an intensely deep violet.

Mr. FOXLEE threw out as a suggestion the use that might be made of the iodine green as a means of avoiding halation. As heat caused the green colour to be converted into violet, a film which contained a little of the iodine-green would, from its colour, give freedom from halation; and, after the negative was developed and finished, the application of heat would convert the green into violet, which would not interfere with the printing.

Mr. F. HOWARD exhibited several transparencies which had been tinted of a warm colour by means of aniline. Two pictures of a similar kind were shown—one of which had received a wash of aniline, the other being left intact. The former was rich and warm compared with the latter. Mr. Howard observed that it was easy to produce warm tones when operating upon dry plates; but what was desirable was the production of such tones upon a wet collodion plate developed with iron in the usual manner.

Mr. Bridge spoke of the desirableness of interposing thin coloured films when printing.

In reply to a suggestion by Mr. Brooks, relative to the possibility of applying aniline dyes for colouring transparencies,

Mr. J. T. Taylor observed that complete sets of aniline colours had been prepared for that purpose. Several years ago he had purchased aniline dyes adapted for transparency painting.

Mr. Howard, in reply to a question, described the method he adopted for removing the backgrounds from his negatives by means of iodine. He cut a piece of blotting-paper to the size required, moistened it with tincture of iodine, and then applied it carefully to the negative. That prevented the iodine from spreading. He finally applied a wash of cyanide of potassium.

In reply to a question by Mr. Foxlee, as to the effect of aniline upon the permanence of silver prints,

Mr. Spiller said that that had not yet been ascertained. With respect to the dye itself, it was bleached by the action of light.

The thanks of the Society were awarded to Mr. Spiller for his communication, and specimens of some of the aniline colours were distributed among the members.

The meeting was then adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fifth "popular" meeting was held in Queen-street Hall on the evening of Wednesday, the 8th inst., when Mr. J. Thomson delivered a lecture on *China and the Chinese* to a large and appreciative audience, and illustrated it by a series of lantern pictures from negatives taken during his six years' wanderings amongst the Celestials.

The glimpses of the manners and customs of this curious but interesting people, and the brief descriptions of their government, &c., as given by Mr. Thomson, were exceedingly interesting, and showed that if his illustrated work, just published, is got up in a like style it must be a book abounding in interest.

Correspondence.

The History of "Neöleo-Peinture;" its Application to Views.—New White Tablets.—Fuchsin.—Photographic Societies.—Complicated Formulæ.—A Pound of Collodion.

One day last autumn a French amateur photographer of my acquaintance residing in Redon called upon me full of glee at having learned a new process, which he communicated to me at once without reserve. It consisted of a method of transferring engravings to glass and then colouring them upon the back, something after the manner of Neöleo-peinture, described in one of my recent letters [see page 129]. He had been taught the process by the travelling agent of a Paris firm, who supplied all the necessary materials, and the results which he had himself at once obtained were very beautiful, and were finished by a broad and handsome gilt border, which he had himself applied to the back of the glass plate. I was very kindly shown how to do all this, and it then occurred to me that perhaps photographs upon albumenised paper might be transferred to glass in the same way as engravings and coloured—an idea which has since proved to be correct.

I will now show how this may be done, leaving it to my readers to make any use they please of the process. A glass plate is first heated before the fire, and then, whilst still hot, some very pale Venice turpentine is thinly smeared over it with a stiff hog's-hair brush, such as artists use in oil-painting. An albumenised paper print, which has been previously soaked in water and then made surface-dry by pressing it between folds of blotting-paper, is now laid with its face against the varnished side of the glass plate whilst still hot and the varnish still liquid upon it, and is rubbed into close optical contact. When this has been done the rubbing is continued by the fingers of the right hand, slightly moistened with water at the tips, which, by a very gentle circular motion, abrades and removes the paper from the glass, leaving nothing adhering to it but a very thin film of albumen bearing the silver image. Of course a great deal of patience and care are required in this rather delicate operation, in order not to rub holes in the film; and I should advise any he-creature who is not of a sufficiently patient order of mind to hand the job over to one of his lady friends, who will bestow proper pains upon it.

The picture now presents the appearance of a very thin transparency upon glass, of a pale red colour, and the next operation consists in painting it with oil-colours diluted with turpentine. This done, it is to be viewed from the face.

Having succeeded pretty fairly with this troublesome process, it next occurred to me to try and do without the glass, and to render the print itself transparent by means of some kind of oil, varnish, or balsam, and paint it as before. In this I was tolerably successful, and it then occurred to me that the process of rendering photographs transparent and colouring them at the back might legitimately form the subject of a patent; so I wrote to a leading London firm on the subject, and they replied in the course of a day or two by sending me the specification of Mr. Duppa's patent for the very same thing, which was taken out twenty years ago, and which I have already described in a recent letter to this Journal.

And now comes the strange part of this story. About a month after I had written to London describing my process the very same thing was patented in France under the name of "Neöleo-peinture;" and I am quite at a loss to account for so singular a coincidence. I wish it, however, to be clearly understood that the highly-respectable firm in London to whom I imparted my secret is above all suspicion of having divulged it, and I believe that the dodge has found its way to the French patent office through some other source, having its origin in my experiments, the nature of which I did not take sufficient pains to conceal.

But my experiments did not stop here. I followed the subject up, and, after spending a couple of months upon it, arrived at a very beautiful and, as I think, most important process of printing and colouring photographic portraits. I frankly confess that if this process could be safely patented I should take out a patent and endeavour to reap some advantage from it; but the validity of such a patent seems to be so doubtful that I have quite abandoned the idea, and, under these circumstances, it is my intention, very shortly, to publish the process in this Journal, and make a free present of it to the brotherhood, in the hope that some of them may turn it to good account. Our "Peripatetic" friend is right in supposing that I am no secret process-monger, and he may rely upon my promise to publish this new method of printing and colouring within a very few weeks—new so far as this, that it has never to my knowledge been published or practised before; and it will, I believe, when known and successfully carried out, prove to be the highest and most remunerative branch of photographic portraiture, in consequence of the great beauty of the results.

Meanwhile I would mention a special application of "Neöleo-peinture," which, although it may possibly have no commercial value, will, I am sure, please many amateurs of taste. It consists in applying this method of colouring to architectural and landscape photographs which are printed upon *plain* paper. The effect is then that of a beautiful water-colour drawing or drawing in coloured crayons. But here, it must be remembered, no retouching upon the face is allowable, because that would produce a glaze upon the parts retouched. The chief difficulty in such pictures is the sky, and subjects should therefore be chosen which have little or no sky or white spaces devoid of detail. The prints, when finished, should be trimmed and mounted upon card-board, like water-colour drawings. Studies of fruit, flowers, and foliage, groups of common objects, interiors of apartments, &c., would be suitable for this style of treatment, but not portraits.

Landscape and architectural subjects, printed and coloured in the ordinary "Neöleo-peinture" style, would often, no doubt, be very fine, if treated by the hand of a clever artist, and this is a novelty which I cannot too strongly recommend to the notice of my readers. It seems to be the proper way to apply colour to a photograph without hiding the details.

It appears that if plaster of Paris be mixed with about eight per cent. of powdered marshmallow root, the mass will harden in about an hour, and may be rolled into thin plates and polished. May not this fact be turned to some use in photography? Suppose, for instance, that a carbon print were made upon a waxed zinc plate, and that the above compound were then applied to it, and pressed at the back so as to form a thin plate, might not this, when hardened, be removed by heating the zinc plate, so as to bring off with it the image in carbon, and would not the result be very fine, whether the surface were polished or matt?

The *Comptes Rendus* states that the new aniline dye, fuchsin, is a powerful disinfectant. It would, therefore, perhaps not only stain but preserve our organifying solutions of albumen and gelatine. Mixed with a little arsenic it has already been applied to the beautifying and preservation of sausages!

Mr. P. Le Neve Foster has put to me some rather puzzling questions, in his letter at page 165, respecting the Photographic Society of France. I regret that I cannot inform him why that Society was constituted in the manner which I described; but he may rely upon the accuracy of my statements, since they were obtained from the printed rules of the Society, which were before me as I wrote. I am told that if I were myself to apply to become a member it would have to be as a "corresponding member," and the yearly subscription would be thirty-three francs. The Society appears to have got on tolerably well all these twenty years, without any scandals or unpleasantness. None of its office-bearers, so far as I am aware, after having been publicly convicted of falsehood and injustice, has still been allowed to retain his seat. The journal has never been made subservient to the private interests of a clique, nor have individuals been rudely attacked by anonymous writers in its columns. No open and loud dissatisfaction has ever been expressed with regard to the conduct of its committees; nor have any of the medals awarded by it been declined with thanks, as an affront; neither has it ever got itself seriously into debt and difficulties.

With respect to the case cited by Mr. P. Le Neve Foster of Hermagis' new lens, I do not see how the Society could have acted otherwise than it did. No member present at the meeting seems to have raised the difficulties and objections which occurred to Mr. Foster, and which would have been reported in the journal had he done so; and it would clearly have been unallowable in the editor to offer his own comments on the instrument in the journal if he had not done so at the meeting, when they could have been replied to or have raised a discussion. In all these matters, as it appears to me, French *etiquette* is strict and fair, and thereby scandals are prevented. I feel perfectly sure that the editor of the *Bulletin* would neither be permitted to attack any person himself in its columns, nor allow it to be done by any one else wielding his pen under the shelter of an incognito.

It seems to be most desirable that a few gentlemen like Mr. P. Le Neve Foster, Major Russell, and others who could be named, who have withdrawn from the London Photographic Society for reasons which must be patent to every one, should now combine to found a new society on better principles and with a higher aim. I do most sincerely hope that this is now under discussion, and that it will be carried out. If only twenty gentlemen, in whom confidence could be placed for straightforward conduct and honourable dealing, would combine to start a "British Photographic Society," I am certain that scores of fresh members would at once flock to their standard and join their ranks. As for the old Society, the best way to help it out of its troubles is to withdraw from it.

In the course of my long experience as a contributor to photographic literature and an experimentalist the following fact has been forcibly impressed upon my mind, viz., that no process or formula which has involved a complication of numerous ingredients has long survived whatever little sensation may have attended its first introduction, and that it is only the *simple* formulæ and methods of working which live and are generally adopted. As an instance of this look back to Le Gray's waxed-paper process. What a long catalogue of different organic and inorganic matters were added to his iodising solution, and observe how many of these have been in turn suppressed as useless! But some operators and experimentalists seem to have a strange proclivity towards whatever is complex in a formula, and a dislike to simplicity, and amongst this class may be reckoned many French and American writers. Depend upon it, complicated formulæ, as modes of working, lead to no practical good result. Often and often the mere sight of a complicated formula, involving half-a-dozen different ingredients, has caused me to pass over unread the entire article. Let everything we do have at least some show of reason for it, and let there be no more empiricism and needless complications in our formulæ.

I observe with surprise that some of the leading makers of collodion in England sell it by the pound. Can any of my readers kindly tell me what is meant by a pound of collodion? Does it mean a pint? If so, why not call it a pint? A pound and a pint are surely not synonymous terms. What would one's butcher think if one were to ask him for a pint of mutton chops? But suppose a pound of collodion does *not* mean an imperial pint or any other pint, what *does* it mean? Does it mean a pound weight? and if so, *what* pound? A pound avoirdupois of 7,000 grains, or a pound apothecaries' weight of 5,760 grains? Did any one ever ascertain by actual trial what a pound of collodion really contains in fluid ounces, as it comes from the maker? I want enlightenment on this subject; for in France collodion is always sold by the litre, and we know exactly what that means. THOMAS SUTTON, B.A.

Stoak Vicarage, near Chester,
April 10, 1874.

EXPERIMENTS WITH EMULSION PELLICLE.

To the EDITORS.

GENTLEMEN,—I have been trying Mr. W. B. Bolton's method of using emulsion pellicle, or rather, I should say, a modification of it.

Having some chloro-bromised emulsion with excess of silver by me, I added enough of the same kind of collodion, unsensitised, to give a slight excess of bromide. About five hours afterwards I added one drachm of glycerine, shook up well, filtered, poured the emulsion (about four ounces) into a stereo.-sized glass dish (about 7 × 4 inches measurement), and put aside to set. In this dish it remained about eighteen hours. I then cut it into pieces of one inch square with an ivory paper-knife. These pieces I detached from the dish and washed them with distilled water in a small dialyser (formed by cutting off the bottom of a porcelain preserve jar), substituting well-washed coarse canvas for the septum of parchment paper or bladder, so as to allow the water to pass freely through, making the dialyser now answer the purpose of Mr. Bolton's percolator. This was immersed in a larger jar, half filled with the distilled water, and lifted up every now and then to let the water run through into the larger jar, and back again into the smaller one when replaced, for about a quarter of an hour. The distilled water was then poured away, and some hot (almost boiling) rain water poured in, and the dialyser, or percolator (as it should, perhaps, now be called) containing the pellicle lifted up occasionally, as before, for about ten minutes. This was repeated three or four times with fresh hot water. The pellicle was then pressed between folds of clean blotting-paper, and dried on a glass plate by heat in a drying-box.

The four ounces of emulsion, when dry, gave me fifty grains of pellicle. Of this I took twenty-five grains and made an emulsion with two ounces of equal parts of ether and alcohol. This was a very slow process, taking nearly all day. Having no tincture of soap handy to carry out Mr. Bolton's instructions, I prepared two or three plates in the ordinary way, coating with emulsion, washing till greasiness disappeared, and immersing in a dish of organifier. I used two organifiers —Colonel Stuart Wortley's salicine, &c., organifier, and bitter ale with one grain of pyro. to each ounce. This latter is rather a pet organifier of mine. I backed the plates, dried them, and exposed two for forty-five seconds each in sunlight, using Dallmeyer's whole-plate rapid rectilinear lens, third size stop; and two for one minute each in clear light, clouds passing over the sun, with same lens and stop. They all gave fair negatives, considering that I developed purposely for the deeper shades of each. There was no difference between the salicine and ale and pyro. plates.

I have by rail sent you one of the plates exposed one minute as a specimen of the lot. I used Colonel Wortley's ammonia, glycocine, and bromide development till detail was fairly out, and intensified, before fixing, with the ordinary citro-silver and pyro. solutions, as I could get no density with the alkaline developer alone. I found that, unless the plates had a substratum of albumen, the films split and stripped off on drying.

The principal objections to the pellicle are the very long time taken to form an emulsion and the very slow way in which the film acquires density with the citro-silver and pyro. intensifier.

I purpose experimenting further with this process, and will send you an account of my doings. The plate sent was organified with ale and pyro. The pinholes in the sky were caused by my taking a print to try the negative without first varnishing; the plate, when washed and dried after fixing, was quite clear of them.—I am, yours, &c.,

Lutterworth, April 7, 1874. JOHN B. C. FOX.

PHOSPHORESCENCE.

To the EDITORS.

GENTLEMEN,—In the article on *Photographing Fluorescent Substances* (see THE BRITISH JOURNAL OF PHOTOGRAPHY, 27th March, page 144) there is the statement and especial reference made of a distinction between electric light and magnesium light, and sunlight not only differing from, but being inferior to, them. I quote from the article referred to, the italics being mine:—

"It is curious, however, to observe that the *electric light is not sufficiently strong in phosphorogenic rays* (rays that induce phosphorescence) *to penetrate the thinnest piece of glass.* Rock crystal will, however, allow them to pass. Thus, if the electric spark be passed across a sulphide over part of which is interposed a plate of glass and over the other a plate of rock crystal, only the portions covered by the latter will become phosphorescent; but both good photographic sunlight and the magnesium light are capable of passing through the glass and inducing phosphorescence."

I think such statements are in opposition to the recorded observations of many experimentalists, and, indeed, to the facts in nature.

In giving the following quotation from Gmelin's *Handbook of Chemistry* (vol. 1, p. 198) allow me to premise that the term "insolation" refers to luminous effects upon a substance after it has been freely exposed to the sun's rays:—

"The effect of *insolation* in rendering these bodies phosphorescent may be *replaced* by that of the *electric light*, produced by passing the charge of a jar through them. Canton's phosphorus becomes beautifully luminous when placed *in a tube of colourless glass, over which an electric discharge is passed;* in a yellowish-red tube no phosphorescence is produced" (Seebeck). "The phosphorescence *produced by electricity* has the *same colour* and the *same duration* as *that induced by insolation*" (Dessaignes); according to Grotthus it is *brighter*." "If the Cantonian phosphorii exposed to the electric spark be placed *under glass* coloured red with oxide of copper it does not become luminous. *Under blue glass it is faintly luminous, under violet rather more so;* and the *thinner the glass the greater the effect*, but not nearly so bright as when it is exposed without any covering to the action of the spark" (E. Becquerel). "Under a plate of rock crystal, smoky topaz, or gypsum (Marienglas), Canton's phosphorus becomes *much more luminous than under a plate of colourless glass, even of less thickness*," &c., &c. (Biot and E. Becquerel, p. 198.)

It is clear that these experimentalists were fully aware of the effects of interposed glass of different thicknesses and qualities upon the action of electricity and substances; but, so far from denying the passage or influence through glass, the reverse is thus clearly stated.

Years since, during experimental researches on phosphorescence, I had occasion to observe many, perhaps hundreds, of cases where the electric light had sufficient power to traverse glass, say, of any accidental thickness as might chance to belong to glass tubes used for experimental purposes; and I may observe that the electric light must be considered as very powerful when we consider the comparison made with insolation, the electric spark occupying, say, one hundred and ninety-thousandth part of a second, and the insolation, or time of exposure of a body to the sun's rays, being an affair of minutes or hours.

So far from the electric light being incapable of passage through glass—or, what is the same thing, of the phosphorescence of bodies affected beneath or enclosed in glass—it is sufficiently-known experience to cite the very apparatus prepared for the purpose, viz., to show phosphorescence, by Geissler and others, to be procured in trade. Here the substances are enclosed in glass tubes, and the light is taken of a few sparks from a Rühmkorff coil, and is sufficient to enable them to glow with phosphorescent light. This is a lecture or class experiment.

I quite agree with the writer that it would be curious, if true, if electric light had no power to produce phosphorescence through the thinnest glass, while burning magnesium and ordinary sunlight are capable of so doing. It is possible that the writer may show the authority for, perhaps, hasty generalisation, and may continue his attention to these interesting appearances of light.—I am, yours, &c.,

April 10, 1874. THOS. J. PEARSALL, F.C.S.

[Our correspondent in the above letter asks for the authority upon which we state that glass interferes with the phosphorogenic rays, and frequently refers to M. E. Becquerel as an authority upon the subject of phosphorii. There can be no doubt that a very large percentage of our information as regards this important phenomenon is due to that investigator, and we therefore refer our correspondent to him as the authority he was seeking. As it is probably more acceptable than the original paper, we will quote from Miller's *Chemical Physics*, fifth edition, page 206:—

"The flash of an electric spark made to pass so that its light shall fall upon a piece of paper thus prepared" [paper covered with sulphide of calcium] "is sufficient to render phosphorescent the whole exposed surface of the sulphide; but if the paper be partially covered by a plate of even the most transparent glass, the screened portion will not exhibit any phosphorescence. A screen of rock crystal, however, produces no such absorbent effect, all portions of the prepared surface being in the latter case equally luminous. The light emitted from charcoal points ignited by a voltaic current, if it be only instantaneous in duration, is equally unable to penetrate glass so as to produce phosphorescence, although it traverses rock-crystal readily. The solar rays, however, traverse either medium equally without loss of phosphorogenic power. A long-continued voltaic light produces a similar result. Glass is only less perfectly permeable than rock crystal to the phosphorogenic rays that accompany the luminous ones."

These remarks originally appeared in the *Ann. de Chimie*, ix., 321. We must also point out to our correspondent that Geissler's tubes have nothing to do with the question in dispute. The sparks in such tubes pass from platinum points inserted in the tubes, and therefore the spark and the phosphorescent body are both inside the tube together, without the intervention of any glass. If our correspondent be in possession of facts which controvert the observations of M. Becquerel we think he should publish them.—EDS.]

THE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Will you kindly grant me a little of your space to offer a few hints respecting the future constitution of this Society?

In the first place, I ask what inducement does the Society, as at present organised, hold out to photographers of great abilities to join? I cannot see that it is any honour to belong to the London Photographic Society in the sense that membership with other societies implies. The most mediocre artist who pays his guinea is on an equal footing, and enjoys the same advantages, as the most accomplished. This is manifestly unfair, and tends to lower the Society in the eyes of the artistic and scientific world. If I have occasion to say that I am a member of the London Photographic Society the impression conveyed to an outsider is that I am a person of some attainments in photographic pursuits; but, if he take the trouble to inquire further as to what is necessary for such membership, and find it is a mere money consideration, he naturally, if he be at all a high-minded individual, feels a sort of contempt for the whole thing, and, I think, rightly so. But if he found that such membership had been gained by some special display of talent, he would have a feeling of respect both for the Society and the member.

Now for a remedy. My suggestion is this—retain the Society on its present footing, if desirable, and let all who feel it their duty to support it continue to do so by the payment of a yearly subscription as at present; but let, say, twenty-five or fifty fellowships be founded (or a greater or lesser number, whichever should be found best), admission to such fellowships to be competed for, and obtained only by the execution of some great work or works of photographic art, by some important addition to our chemical knowledge, or by the working out and bringing to perfection some valuable process—the decision as to the artist most entitled to the coveted distinction to be left in the hands of the *whole* of the members, town and country alike, and the competition to take place at the same time as the annual exhibition.

Some such scheme as this would, I think, not only tend to raise the status of the Society, but in the case of a professional photographer obtaining the honour be of some pecuniary advantage to him, as an artist who had by competition raised himself to the high position of "F.L.P.S." would be able to command much better remuneration for his work, the whole arrangement tending, I think, in the long run to give much more satisfaction than any medal awards.

One word more. Why not make it a *sine quâ non* that any person in future wishing to become a member be not considered eligible until he had produced and deposited with the Society say three pictures of a certain degree of merit, the Council for the time being to be the judges as to whether or not such pictures reached the standard laid down?—I am, yours, &c., J. VAUGHAN.

Oxford, April 14, 1874.

SENSITISED GELATINE PELLICLE.

To the EDITORS.

GENTLEMEN,—The great difficulty with the gelatine process in the hands of most has been the want of obtaining sufficient density in the negative when exposed in the camera.

Now this is not an impossible thing to obtain, for I have some negatives, and prints from them, taken by an amateur, and very kindly sent by him from the country to me. The subjects form a severe test for the process, being cattle in motion. The pose and repose of the cattle are, I think, very beautiful; and I am sure it would have gladdened the heart of Cooper (the animal painter) to have seen such groups. The pictures themselves speak for the rapidity of the process, the exposure, I am informed, being from one to two seconds, with landscape stereo. lenses and a three-eighths stop.

I am glad to say that I have now overcome the little drawback with regard to density, and can produce density as easily with the camera as with the transparencies by contact. Herewith you will receive two negatives—one slightly intensified; the other not so, but simply developed. Your opinion on them will oblige.—I am, yours, &c.,

8, *Maddox-street, Regent-street, London,* R. KENNETT.
April 15, 1874.

POST-MORTEM PHOTOGRAPHY.—I must tell you how I got out of a scrape recently. Perhaps some in a similar "fix" might not think of it. I was called away, about ten miles from home, to photograph a corpse, and upon arriving and unpacking my camera I found the plate-holder had been left at home; it was but two hours till the time for the funeral. No gallery nearer than mine, and it was out of the question to go back after it. I kept a straight face and said nothing, but proceeded as follows:—Got everything arranged—camera in position, focussed, and racked out the tube the thickness of the negative glass, carefully noted the position of the camera on the stand, and removed it to the dark room; then covered the back of the ground glass with the focussing cloth, folded in several thicknesses; then set a strip of pasteboard on edge at the bottom of the ground glass, on the inside, of such width as to bring the plate up to proper place, and secured with pins at either end; placed the plate in front, and in contact with the ground glass, and found the bath on the back of the plate held it there nicely; placed the camera back on the stand as before, and fired away. Got my negative all right, of course. Would not advise anyone to leave the plate-holder behind when they go out, but if they should I know of no better way out of it.—L. MOULTON, in *Phil. Phot.*

EXCHANGE COLUMN.

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

A very good dark tent and tripod stand, for plates 10 × 12, in exchange for a 10 × 12 view lens of any noted maker.—Address, E. Pilling, 239, Rochdale-road, Bury, Lancashire.

Wanted a tourist camera, 7½ × 5½, with pair good stereo. lenses and small doublet, in exchange for a 12-inch square camera, bellows body, screw adjustment, single and repeating backs, or first-class jewellery.—Address, W. H. Miller, Carmarthen.

Show case, glass all round, on pedestal, suitable for either centre of room or standing next the wall, with sliding doors (size 6 × 7 × 2 ft.), in exchange for Dallmeyer's or Ross's large lens. Value adjusted.—Address, F. W. Evans, 246, Old Kent Road, S.E.

Ross's stereo. portrait lens, with silver Albert chain and drop, or the lens with quarter-plate mahogany camera and tripod, offered for Dallmeyer's rapid rectilinear, seven and a-half back focus, or Steinheil's aplanatic doublet lens, seven-inch back focus. Cash difference paid.—Address, Maurice O'Conor, Cahirdaniel, Cahirciveen, Kerry.

A nearly-new patent ebonite bath and dipper, for plates 12 × 10, water-tight, with mahogany support, and waterproof wrapper for carrying it in, in exchange for a large porcelain or glass bath, for plates 15 × 12, or a good stereoscopic camera, &c. Difference in value adjusted by cash.—Address, Mr. John Porter, St. Mary's Barracks, Chatham.

ANSWERS TO CORRESPONDENTS.

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

Registrations.—Next week.

J. S. Hailes.—It is probable that we shall very soon reproduce as much of the description of M. Silvy's studio, together with the diagram, as will prove interesting.

Henry Barton.—If you have not previously tried a dry process, we advise you to begin with either the tannin or coffee process, both being nearly similar in effect and altogether so in manipulation.

G. S. B.—The "gentleman" who is the object of your inquiry happens to be a lady. As we believed she would appreciate your commendatory observations we have forwarded your letter to her.

Frank W. Micklethwaite.—We had, doubtless, misapprehended your meaning. By the formula given as an answer to "Natal" in this page very good enlargements have been produced by an American artist, on whose recommendation we advise you to give it a trial.

Excelsior.—We have seen the reflecting stereoscope of Sir Charles Wheatstone, but do not think that, as respects either efficiency or convenience, it can compare with the lenticular stereoscope. It certainly affords the means of viewing pictures of large dimensions; but such pictures do not, when thus viewed, appear to be so large as a small picture of the ordinary kind when examined in a lenticular stereoscope with eyepieces of short focus.

R. Bridgart.—1. The process by which the Ferrier's slides are printed is albumen upon a substratum of washed collodion.—2. We shall reply to this query afterwards.—3. The best way to shorten the focus is by the substitution of a new back lens for the present one.—4. We have long known and often asserted the fact noticed by you, viz., that the kind of condensers engraved in our articles on the magic lantern give a more uniformly-lighted disc and better definition than the plano-convex ones mounted as you describe.

Amateur (Kerry).—1. Makers of collodion do not usually publish their iodising formula.—2. Black japan varnish is objectionable—shellac varnish is better; but no base metal should be employed as corner-pieces for holders.—3. Carbonate of soda will precipitate all the silver; kaolin will not.—4. We advise you to dye your pictures after they are printed.—5. By the term is meant *without water*.—6. Add more silver, and test the strength by a hydrometer.—7. We cannot tell.—8. There is no difference between the lenses, except in respect of focus and in one being slightly more rapid than the other.

A Country Vicar.—The removal of the albumen from the paper during sensitising may be accounted for by the silver solution being alkaline or too weak. Add more silver to bring it up to about fifty or sixty grains to the ounce, which can be approximately ascertained by means of the hydrometer; and add acetic acid to render it acid to test paper. The heaviness of the shadows of the print enclosed is caused by the negative having received an insufficient exposure. The brief rule is this—over-exposure gives over-soft and flat negatives; under-exposure causes the pictures to be hard, patchy, or wanting in gradation. Perfection lies between these two extremes.

Natal.—Salt the paper for enlargements with the following:—

Iodide of potassium	2 parts.
Bromide of potassium	1 part.
Filtered whey	100 parts.

Excite the paper on a thirty-grain bath, strongly acidulated with glacial acetic acid; expose while wet until the image begins to appear, and then develope by means of a one and a-half-grain solution of pyrogallic acid, each ounce of the developer containing a drachm of glacial acetic acid and about a grain of bromide of potassium. After the picture is developed it must be toned in the usual way.

J. U. N. inquires:—1. Is there a better way of exposing sensitised paper in a camera than by putting a plate of very good glass into the slide then the paper, and then a pad to keep it pressed up? If so, what is it?—2. Is there any method by which pyrogallic acid can be kept in solution for some time, so as to be always ready for use in alkaline development? It is bad to weigh.——Replies:—1. There is no better method for exposing paper than the one described by our correspondent.—2. Pyrogallic acid is soluble in alcohol, and when dissolved in this menstruum remains in good working order for a long time. We have some that was dissolved in May last, and it is still good. Let the solution be made very strong, and then add one or two minims to the water that is to form the solvent of the developer.

A Very Old Member of the Photographic Society.—This correspondent, whose letter we do not print *in extenso* owing to his withholding his name, evidently does not consider the retirement of the President a matter for regret:—"If any members," he says, "doubted the course pursued by the 'reforming section,' the one adopted by Mr. Glaisher—namely, absolutely refusing to work with the six gentlemen duly elected to fill the vacancies, and by circular totally ignoring them, and then in person, last night, after a pompous and special-pleading speech endorsing that course—should convince them that the old Council was a clique, and by breaking it up the future of the Society and its success is much better secured." He says further that the late President's "very peculiar style has been a damper upon the meetings, silencing many young and clever men who otherwise would have spoken out upon the various subjects introduced. His departure has been a sense of relief to most of the members, judging from the remarks made in the room after the meeting. Many men of high position have retired from the Council from time to time; and last evening the absence of most of the leading members of the Council showed they had little in common with the President in the unwise and uncourteous course he pursued."

Received.—J. Cooper; Reuben Mitchell.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photography in Court.—The case of Richard Turnbull (reported in our last issue, page 177), charged with stealing photographs from Messrs. A. and G. Taylor, Queen Victoria-street, was tried at the Old Bailey on Friday, when the prisoner was sentenced to eighteen months' imprisonment with hard labour.

Lens Frauds on the Continent.—Continental photographers are being "sold" by a person who professes to come from "Oxford Street No. 28 London," and who represents himself as the traveller for Mr. J. H. Dallmeyer, the well-known optician. His mode of action is very peculiar and ingenious. He calls upon photographers, soliciting orders for Mr. Dallmeyer's lenses, quoting prices at such an astonishing reduction, by way of discount, from the catalogue prices as to cause him to be well received and to obtain numerous orders. This secures him an opportunity for practising his real business—that of a varnish and secret nostrum vendor—which is conducted on the ready-money principle. He uses Mr. Dallmeyer's name to get an introduction, and, shielded by his reputation, obtains good prices for his nostrums and formulæ, for which he doubtless finds ready sale. To the letters of complaint which reach Mr. Dallmeyer, finding fault with him for not supplying the goods ordered through his "traveller," only one answer can be sent, viz., that A. Genètier, of "Oxford Street No. 28 London," is absolutely unknown in this country. A handsome reward has been offered for his apprehension. It is exceedingly annoying that the reputation of an eminent optician like Mr. Dallmeyer should, even temporarily, be jeopardised in the slightest degree by the actions of an unprincipled scoundrel.

METEOROLOGICAL REPORT,

For the Week ending April 15, 1874.

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

These Observations are Taken at 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
9	29·77	SSW	45	49	54	41	Fine
10	29·39	W	45	47	55	45	Dull
11	29·25	SW	42	46	51	38	Dull
13	29·46	SW	44	46	52	39	Dull
14	29·69	NE	44	45	54	41	Dull
15	30·07	N	44	45	—	41	Dull

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

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 729. Vol. XXI.—APRIL 24, 1874.

A READY METHOD OF ESTIMATING THE CHEMICAL FORCE OF THE SUN'S RAYS.

In the previous articles in connection with this subject the various modifications of the oxalate of iron process have been given. We ourselves know of no salt more manageable as regards the chemical action of light, and, therefore, wish now to offer a few suggestions based upon actual practical experiments.

The chronological details of this process may be given in a few words, as follows:—The use of oxalate of iron was suggested (1862) by Dr. Draper, of New York, and a working process given by Mr. H. Draper, of Dublin, in which the estimation is arrived at, by the weighing of the vessel in which the action has taken place, the loss of the carbonic anhydride (carbonic acid) representing the amount of decomposition effected in the iron salt. The carbonic anhydride being a gas is displaced by passing through the solution a stream of hydrogen, and there is a special arrangement by which this can be brought about. M. Marchand's process (1872) was detailed in an article in our issue of the 10th inst. Concisely put, his process consists in using a mixture of perchloride of iron and oxalic acid. In other words, it may be called a mixture of free hydrochloric and oxalic acid with variable quantities of ferric oxalate and ferric chloride; for it has been found that, when we have two salts in solution, the acids mutually divide themselves between the two bases. In this process the amount of decomposition produced by the light is determined by weighing, as in the previous process. To prevent the retention of the gas glycerine is used, carbonic anhydride being insoluble in that fluid according to M. Marchand's experiments.

There are sundry weak points about all the processes enumerated; but this is not the place, nor is it our wish, to criticise. Our object in reverting again to this subject is to offer some suggestions in the way of improvements.

First: as regards the vessels in which these experiments are performed. Glass vessels have hitherto been used, and the rays of which we want to measure the chemical force enter through a glass pane. Now here is probably one error. If we wanted merely to measure the relative actinic force at different latitudes, or at different periods of the day, it would be immaterial; but where we are dealing with absolute measurements the well-known absorptive action upon the chemical rays of different media must have something to do with the question. We think this is one of the interfering points upon which some accurate experiments should be first made; but we are also inclined to think that the orifice through which the light enters should be an extremely thin plate of quartz, or, what would be better, nothing at all.

Miller says—"Glass, even in very thin layers, absorbs the whole of the more refrangible rays." Of course it is here meant that it will exert some absorptive action upon the whole of the chemical part of the spectrum. Again: Stokes says that the chemical rays are identical with those which produce fluorescence. Now, if this be the case, and as we know practically that glass interferes greatly with the rays that produce fluorescence, it follows that it will interfere with actinic influence generally.

In connection with the statement that glass, even in thin layers, absorbs the whole of the more refrangible rays, the following remarks have been made, namely, that a hasty consideration of such experiments might lead to the conclusion that lenses of quartz, or of water enclosed in quartz, would be far superior to those of glass in ordinary use by the photographer. This, however, is not the fact. Glass is very transparent to the less refrangible portion of the chemical rays, extending beyond the violet end of the visible spectrum to a distance as much beyond the line H as the red end of the spectrum is below it. These are the rays which most affect the bromides.

These rays are precisely the most abundant and powerful chemical rays in the solar spectrum, which contains but a few rays of a refrangibility much beyond this point, whereas in the electric arc the highly-refrangible rays predominate. We, therefore, think that some experiments are still required to determine through which of the media the light should enter. The orifice, of course, should be a square inch, or any other superficial standard which may be determined upon.

We are, therefore, of opinion that this orifice should be covered with a thin plate of quartz in preference to glass, and that the best and most convenient apparatus would simply consist of a long beaker arranged to fit a case. In the top of the latter should be inserted the pane of quartz or any other medium used. As we do not propose to estimate the chemical action by the loss of carbonic anhydride, it is not necessary to make any arrangement for displacing that body, or for weighing the apparatus. The case should, however, be blackened, and such an apparatus could be easily made out of any round cardboard box used for putting up proprietary articles.

The solution we should propose to use is the ammonio-oxalate of iron, it is so manageable and definite. The result of the action of light upon this salt has been already pointed out. It may be expressed in the following equation:—

$$\underbrace{Fe_2\,(C_2\,O_4)_3,\,(NH_4)_2\,C_2\,O_4}_{\text{Ammonio-ferric oxalate.}} = \underbrace{2\,Fe\,C_2\,O_4}_{\text{Ferrous oxalate.}} + \underbrace{(NH_4)_2\,C_2\,O_4}_{\text{Oxalate of ammonia.}} + \underbrace{2\,C\,O_2}_{\text{Carbonic anhydride.}}$$

If we are dealing with an acid solution the liquid, which is of a brownish-yellow hue, remains clear; but the protosalt is after a little time precipitated by the action of the light. It is found that if the liquid be much agitated during the actinic influence the decomposition is a little slower than would be the case with the acidulated solution. This is probably owing to the opacity of the liquid from the precipitated protosalt. Therefore it is preferable to leave the vessel in a quiet situation, so that as the decomposition proceeds from the surface downwards the precipitate shall gradually be deposited as the decomposition proceeds.

Now, it is self-evident that this decomposition may be either measured by the carbonic acid eliminated or by the protosalt of iron formed, because on referring to the equation it will be perceived that this takes place equivalent for equivalent. We propose to estimate the latter by a volumetric solution, as being more simple and very readily performed when we once have the solution made. To work this a comprehension of the construction of the said solution is necessary, and we must therefore reserve the explanation until our next issue. The solution we use is one of chromate of potassium.

EFFECTS IN CAMEO VIGNETTES.

When "cameo vignettes" were first introduced, observing the coarseness of the surface of even the finest albumenised paper, and perceiving in such coarseness a drawback to the fullest development of the idea, we suggested at the time of its introduction the advisability of enamelling the surface of the picture to be embossed in preference to remaining content with the plain albumen surface. We then said (see our number for March 31, 1871):—

"In order that the utmost capabilities of the new 'cameo vignette' should be thoroughly developed it is necessary that instead of the print being taken upon albumenised paper it be obtained upon enamelled or, as the French call it, 'porcelain' paper. The cameo vignettes are very beautiful, even on albumenised paper; but still the finest samples of this kind of paper have a degree of texture or granularity that is absent in porcelain paper. At first sight, and when suitably mounted and viewed at a slight distance, the 'cameo' is liable to be mistaken for a picture burnt-in on enamel, but a closer examination reveals the texture of the paper. If enamelled paper were employed instead of albumenised paper then detection would be rendered extremely difficult, except by a pointed or edged instrument."

Acting upon this hint, several of our professional readers introduced enamelled cameos, and have been prosecuting their production as a branch of their business during the period which has elapsed since the summer of 1871. We have in our possession several pictures of this kind taken at the period mentioned, the hints for producing which were either received from ourselves or from a capital paper, containing practical directions for producing enamelled cameo vignettes, then designated "Vienna enamelled photographs," by Mr. Atkinson, of Liverpool, which was published in the spring of the year mentioned.

We find that M. Reutlinger and other Parisian artists have now entered the same artistic field, and we are pleased at this because of the well-known tendency of our brethren in this country to follow the French lead in matters of taste. As these embossed enamel prints are said to be greatly in vogue in Paris let us hope that the fashion will become epidemic among ourselves.

Messrs. Marion and Co. are rendering effective service in the popularising of this class of picture by the exhibition of choice Parisian productions; and we feel certain that if the profession throughout the country were to enamel and then emboss some of their portraits and exhibit them freely they would find a marked increase in their business.

Directions for enamelling photographic prints have been frequently published, both in this Journal and in our Almanacs; but it will serve to keep the subject fresh before our readers if we subjoin the directions given in the circular issued by Messrs. Marion and Co.:—

"Take a piece of patent plate glass and clean it thoroughly, then coat it with Mawson's enamel collodion, and allow it to dry. Now make in a dish a gelatine solution—one ounce of pure gelatine in eight to ten ounces of water; take the unmounted prints, which are in all respects finished prints, and immerse them in the warm gelatine. Quickly take them from the gelatine solution and lay them face downwards on the collodionised glass plate, using a squeegee to press out all air-bubbles and to enforce a perfect contact. The prints are now allowed to dry for an hour or more. We are told that to hasten this artificial heat may be used, but only a gas stove, the ordinary coal stove causing too much dust. After the prints are perfectly set take a thin piece of fine cardboard and coat the face with any strong mounting solution, and then lay it face downwards on the back of the print which is on the collodionised plate, squeezing it well into contact. When the whole is perfectly dry the collodionised print with its backing is cut away from the plate; the prints are now trimmed to proper size, put into the embossing press to receive the convexity, and are then ready to be mounted on the usual mounts according to size. We further offer a suggestion which we are informed facilitates the peeling off the film from the glass; that is, to dust the glass before collodionising it with powdered talc."

We do not put this forward as anything *new*—for keeping in mind what we have just written it cannot be thus regarded—but we do so in the commercial interests of our readers, at the commencement of a new season and in the prospect of this branch becoming increasingly popular. We still entertain and here reproduce the opinion we held so strongly in 1871 with regard to enamelled cameos:—"We hope that our professional readers will not allow the summer to pass away without making a strenuous effort to have them introduced, and this hope is expressed as much in the interests of themselves from a pecuniary point of view as in that of the picture-loving public—a public not so slow in appreciating and readily paying for what is really beautiful as some people are apt to imagine."

A FEW WORDS ABOUT VALUATIONS INTERESTING TO PARTNERS IN PHOTOGRAPHIC FIRMS.

As we have the honour to number amongst our readers nearly all the leading professional photographers in this country; and as, of course, they include a great many partnerships, subject to the usual dissolutions and rearrangements, and all the questions of valuation which naturally flow therefrom, we think the following brief account of a dissolution, valuation, and arbitration which recently came under our notice may be both interesting and useful, especially as the principal point in dispute is one very likely to arise, and also because the solicitor acting for both parties has endorsed the arbitrator's award, holding that the reasoning of the latter is sound and his conclusions just.

Mr. A., who had carried on for many years a considerable business, died in 1872, leaving his wife sole legatee and executrix. Some time afterwards she entered into a copartnership with Mr. B. The deed of copartnership, amongst other things, provided that Mrs. A. should be entitled to draw from the business three pounds, and Mr. B. two pounds, per week, and that the profits over and above such amount of five pounds were to be equally divided between both partners. It was further stipulated that the partnership might be determined by a three months' notice on either side, and that half the value of any increase of apparatus, stock, or material, taken at a fair valuation, should be paid by the retaining to the retiring partner; but that nothing in the shape of "good-will" should be included in such valuation. Mr. B. put no capital into the business, his skill and labour being considered equal to the plant and connection possessed by Mrs. A.

The partnership existed for fifteen months, when it was terminated by Mr. B. giving the stipulated notice. Mrs. A. and Mr. B. each appointed a valuer for the purpose of ascertaining the amount to be paid by Mrs. A. to Mr. B., and as the respective valuers differed materially on certain points Mr. C. was called in as arbitrator, both parties agreeing to consider his decision final.

The articles whose value was disputed included a set of rocks, some backgrounds, frames, mounts, &c., a lens, and two thousand four hundred and seven negatives. With the exception of the negatives the difference of opinion of the valuers was not material, and the adjustment was simple enough. In the case of the negatives, however, it was not so easily managed. One valuer considered that under the deed of copartnership the fair estimate was only forty pounds two shillings and three pence, while the other considered them worth two hundred and forty pounds seven shillings, giving the following as his reasons:—"Being negatives recently taken, and belonging to an established business intended to be carried on, no wise photographer would part with them for less if he really intended to retain his connection; and, as the business is situated in one of the best parts of the city, I consider the negatives are quite worth the sum named."

Of course a difference of two hundred pounds four shillings and ninepence showed that the valuers must have looked at the subject from very different points of view, and it required the arbitrator to hear both sides of the question, and then consider carefully how to dispense justice to both parties. The result of his deliberations was an award of *fifty pounds*—ten pounds more than the one, and one hundred and ninety pounds less than the other valuer had considered a fair estimate. To his award he appended a note, which, as it contains the gist of the matter, we quote entire:—

"The great difference of opinion between the valuers as to the value of the negatives induces me to note in giving my decision—

"1. That by the terms of contract of copartnership, good-will is disallowed.

"2. If the negatives were to be taken at the higher valuation it would be virtually paying for good-will.

"3. These negatives have already been paid for by the customers by whom they were ordered, and the profits thereon divided between the partners.

"4. By the Copyright Act the property in a negative is thus divided:—The glass on which the picture is taken and the material of which the image is formed belong to the photographer; while the image itself and the copyright therein are the property of the sitter, or whoever gave the commission for the work, unless the copyright was by special writing vested in the photographer. In this case there is no assertion that such transferrence of copyright was made; and, therefore, as the right to use the negatives belongs not to the photographer but to the sitter, it seems to me that they ought not to be appraised at anything much beyond their intrinsic value.

"5. But as a certain increment of profit may accrue to the holder, a share of which would have fallen to the retiring partner had he remained in the business, I have allowed what I consider a reasonable sum over and above the cost of glass and material."

We make no comment on the above plain statement; but, having given our readers the means of forming their own conclusions, would strongly advise intending partners to be careful in seeing that no ambiguity exists in the terms of copartnership to which they have agreed.

METROPOLITAN PHOTOGRAPHIC INDUSTRIES.

THE ALBION ALBUMENISING COMPANY.

In furtherance of a design we formed some time ago of giving an occasional paper on some of the photographic factories and workshops of the metropolis, we recently visited the new establishment of the Albion Albumenising Company, situated in Brackenbury-road, Hammersmith.

The business of this Company, chiefly connected with the preparation of albumenised paper, is carried on in a large and well-lighted building occupied for the first time in connection with photography. The premises contain numerous rooms, each of which is devoted to one or other of the numerous departments into which a large albumenising trade must necessarily be subdivided.

The Albion Albumenising Company was established by Mr. J. Skinner, who, about twelve years ago, began to seek in photography some relaxation from his monotonous official duties as accountant in the National Bank, Aberdeen. To accomplish his object he first of all placed himself under the tuition of Mr. Rodger, of St. Andrews, one of the most successful of our Scotch photographers, and from that gentleman he acquired a knowledge of the art, including the making of collodion and the albumenising of paper. His leisure time now became occupied in preparing and experimenting with albumenised paper, his townsman, Mr. Wilson, so noted as a landscape photographer, kindly assisting him by testing his productions and aiding him by valuable hints. Mr. Skinner's operations at this period were carried on upon a very small scale, the albumen obtained from only about one or two dozen eggs being sufficient at a time; but the albumenising of paper soon became with him a passion, under the influence of which he relinquished the practice of painting, in which up to that period he had in his spare moments indulged *con amore*. He would frequently commence his albumenising experiments at eight o'clock at night, and only leave off when morning had far advanced.

At starting Mr. Skinner laboured under a disadvantage which has doubtless proved to be a sore grievance and a source of painful annoyance to the aspirations of many an incipient albumeniser, namely, the difficulty of obtaining an absolutely smooth and uniform film. The albumen *would* run in streaks, do what he might to prevent it. Adopting the then popular notion as to the cause of this nuisance, viz., that it was owing to currents of air acting upon the sheets during drying, he adopted several methods of obviating this imaginary cause.

In order to ascertain the source of the difficulty under which he laboured, and to secure a remedy for it, he visited London, and called upon several albumenisers without obtaining the desired information, one gentleman declining to allow him to see his method of operating although he should pay down a hundred and twenty pounds—a demand which Mr. Skinner considered too high. His visit, however, was far from being fruitless; for he ascertained one or two things that were of value:—First, that in the north he was using the same description of apparatus employed in the metropolis; and, secondly, an improved method of applying the albumen to the surface of the paper.

The origin of the streakiness he afterwards discovered to arise mainly from his using the albumen before it had become ripe. In the albumenising of paper the golden mean must be hit between absolute freshness and staleness. Stale albumen flows with great smoothness and uniformity, and gives a surface possessing great brilliancy; but the latter is attended with serious drawbacks, inasmuch as a large portion of the brilliancy disappears after the paper has been silvered, printed, and finished, while it is liable to rapid discolouration after being sensitised. Fresh albumen, on the contrary, produces a paper which will keep white and good for a considerable period after being sensitised; and to secure this valuable mean between too stale and too fresh albumen has been the constant endeavour of the Company.

We might here stay to inquire into the subject of the relative permanence of photographs printed upon paper prepared with stale and with fresh albumen; but we are not aware that the facts connected with such an investigation have yet been so fully ascertained as to warrant us in arriving at a conclusion. What every photographer who buys paper indiscriminately, especially from foreign makers, knows well is that some samples of albumenised paper possess a most offensive odour. This is owing to the albumen being kept until it has arrived at a partially-decomposed state before being applied to the paper; and this preference of stale albumen by certain albumenisers is not a matter of accident, but of deliberate intention.

Having eventually succeeded in preparing a good and reliable paper on a large scale—for it was found that experiments conducted on a small scale with about a dozen eggs did not afford a clue to the difficulties to be encountered when operating more extensively—Mr. Skinner extended his operations, and established a business styled the "Scottish Albumenising Company"—a designation eventually discarded in favour of that by which the Company is at present known. A traveller was now employed to introduce the paper to the notice of the public generally, the result being that Mr. Skinner dissolved his connection with the bank and removed to Glasgow, in order to place his manufacturing venture on a broader and firmer basis. After remaining in the Scottish commercial capital for four or five years, some difficulties arose in connection with eggs which prompted him to remove to London, where, as we have seen, his factory is now established.

One of the waste products of the albumeniser is of so much consequence as to require serious attention. We allude to the yolks of the eggs used in the manufacture. These are, fortunately, an important requirement in connection with the trade of the currier; accordingly Bermondsey, the seat of the London leather trade, is a quarter in which can be absorbed, for manufacturing purposes, an almost unlimited supply of the yolks of eggs. As Mr. Skinner's albumenising business had been increasing at the rate of twenty per cent. per annum, the obtaining and disposal of the eggs was evidently a matter demanding consideration, which will be the more readily appreciated when we state that last year alone no fewer than twenty-seven thousand dozen eggs, or more than a thousand eggs per working day, were used. This number represents prepared paper to the extent of about eleven hundred reams, assuming that twenty-four dozen eggs or thereabouts are required for each ream. By making an increased effort as many as from thirty to forty reams of paper were albumenised during some weeks of last year.

In order to meet a demand on the part of some of his customers—that the paper should possess the highest possible degree of glaze and body of albumen—some experiments were tried to effect the introduction of gelatine as a preliminary coating; but this was found to be objectionable and was relinquished. He then had recourse to double albumenising for the accomplishment of the same object, and about seven or eight years ago a patent was obtained for this method of preparing paper.

The principle of double albumenising is simple. Sheets of paper are coated with plain albumen, and, when dry, are placed in a close chamber into which very hot steam is admitted. The moisture of the steam softens the surface of the albumen, which by the heat of the steam is immediately coagulated. The paper thus coated with insoluble albumen is now prepared with the ordinary salted albumen, which is prevented from sinking into the paper, and consequently imparts a high degree of glaze, and produces prints of the very finest quality.

We saw the preparation of tinted paper going on during the time of our visit to the works at Brackenbury-road. Three colours are employed, viz., mauve, magenta, and blue, there being three tints of each. As the mauve and magenta are soluble in water they are mixed with albumen in the proper proportions; but the blue, being insoluble in water, cannot be applied in that way, but through the agency of an alcoholic solution with which the surface of the paper is treated previous to the application of the albumen.

We here pause to make a comment on this method of drying paper. Albumenisers would certainly consult both their own convenience and that of their clients if, instead of preparing tinted albumenised paper, they were to confine their productions to pure white, sending out with their paper bottles of aniline preparations of various colours so as to enable photographers to tint their prints after they are fixed; and this, by-the-bye, the Company express their intention of doing. It is the easiest thing imaginable to do this, all that is necessary for the purpose being the addition of a little aniline dye to the water in which the pictures are washed. Preparatory to writing this article we had made several trials in this direction, and, as the result, have tinted some photographs with a degree of uniformity so perfect as to defy the most experienced printer or albumeniser to distinguish between prints produced upon paper in which the albumen was tinted before being applied and that tinted after the picture was finished.

The albumenising of paper is not the sole business carried on by this Company; they also prepare arrowroot and other paper for enlarging. Arrowroot, as many of our readers are aware, furnishes an excellent material for sizing paper. The surface is rendered so close as to permit of collodion being retained upon the surface without sinking in; and it was upon arrowroot-sized paper that the collodion prints of the United Association of Photography (who used the Wothlytype process) were produced. The method of sizing paper by this agent is somewhat laborious, as persistent, uniform, friction with a sponge is requisite to its proper and even application.

With regard to the description of paper used for albumenising, we are told that this Company use Saxe and Rive in the proportion of three-fifths of the former to two-fifths of the latter. The Rive, however, is the more easily prepared, as it holds the albumen better; hence the same quantity of albumen would make a better surface on Rive than on Saxe paper. Saxe is more impervious to moisture than Rive, which is more glutinous.

Not long since we described the very simple means adopted by Mr. Le Neve Foster in testing the non-actinism of glass. During the present week, in the course of a conversation upon this subject with Mr. J. A. Forrest, of Liverpool, that gentleman described to us the manner in which he carries into effect Mr. Foster's suggestion, and adopts it for testing the quality of all the non-actinic glass prepared in his establishment. A piece of board 15 × 10 inches is covered with black velvet. At one end of the board are two wire erections capable of holding a small prism so placed that it stands across the board, from which it is raised up to the height of about five or six inches. At the farther end of the board is laid down, and flat upon it, a narrow strip of ordinary looking-glass, of the breadth of about a quarter of an inch, and situated so as to extend nearly from side to side of the velvet-covered board. The piece of glass to be tested is placed in a nearly erect position between the prism at one end of the board and the strip of silvered glass at the other, and the spectrum from this mirror is then examined. According to the mode in which the blue and adjacent rays are seen to be stopped so is the sample of non-actinic glass determined either to be passed for sale or again subjected to the colouring process. As an ordinary shilling prism answers for this purpose, every photographer has it in his power to test the quality of the glass intended for dark-room windows.

In our issue of last week, page 187, we learn from our friend Mr. Sutton that so recently as last autumn he had intended to patent the well-known method of painting the back of a photograph with heavy body colour, said to be recently introduced into France under the designation of "Neôleo-peinture." Our correspondent's communication has set us wondering how it so frequently occurs that men apparently up to everything in connection with our art seem to lose sight of, or altogether overlook, many really valuable "wrinkles" that, owing to their worth, become popular. The method of painting on the back of a photographic print, so far from having been "buried in oblivion," as Mr. Sutton thinks, till he called it into life, has really during at least the last six years been very extensively practised by many ladies in all parts of this as well as other countries, and varnishes specially prepared for the purpose have long been articles of commerce. We have before us, while we write, some very beautiful examples kindly presented by some of our fair friends to whom we had given instructions as to how to prepare the transparent varnish which we had found most suitable, and which consists of about one part of Canada balsam to two parts of turpentine. Two of these specimens were done in Paris, and one in Mentone, so that the practice cannot be said to have been confined to one spot. They all, however, have one fault—want of adhesion to the mounting boards; and, if our friend would turn his attention to the discovery of some adhesive material to firmly bind the oily surface to the stiff millboard, which is the most suitable mount, he would confer a boon on many who are desirous of abandoning crochet and Berlin wool in favour of the really beautiful art now called "Neôleo-peinture."

ON THE PREVENTION OF BLURRING.

When blurring is to be prevented by the application of a backing to the plate it is most common to use a thick pigment mixed with gum and water; but it has also been proposed to coat the back with deeply-coloured collodion. This last method I have never employed, but recently undertook some experiments to test its probable efficacy. Some plain collodion was coloured with a mixture of rosaniline and coralline, and a clean glass plate was coated with it. In drying, parts of the film dried dead and other parts clear. The plate was tested by a method which I proposed years ago, and afterwards found I had been anticipated by Major Russell, viz., by examining the image of a small flame placed fifteen or twenty feet distant. An absolutely perfect backing should give but one image of the flame, no matter how much the plate is moved about or what part of the plate the image is reflected from. (The observer should sit with the light on his left side, or look in a direction at right angles to that of the light. Then, holding the plate in a diagonal direction, the image is seen on it, and, by moving the plate, is easily carried over every part of it.)

In the present case a second image was always very plainly visible. When the image came from a portion of the plate in front of the transparent part of the backing the secondary image was ruby red; when it came from a portion over the dead part of the film the secondary image was of the natural yellowish-white colour. I conclude, therefore—

1. That the index of refraction of the collodion film differs widely from that of glass (probably it is much greater, in consequence of the large proportion of carbon contained in collodion).

2. That where the film dries dead it is probably not in optical contact with the glass, and, therefore, gives no sort of protection.

3. That where the film dries clear there is some protection, but it is not certain that the protection is complete. The secondary image is ruby red, which is very favourable; but there remains a question—From whence does this ruby reflection come—from the front or back surface of the collodion film? Probably the latter. If so may there not be a *white* reflection also from the first surface of the

collodion film, masked to the eye by the powerful colour of the red reflection from the back? If there are two reflections, from front and back, these would be exactly superposed by reason of the extreme thinness of the collodion film, and not separated, as in the case of glass.

It is, therefore, to be concluded that the backing made of gum and pigment is the safer. I have for a long time used and recommended annotta, which has the advantage of not needing gum to be mixed with it. But if the annotta be simply mixed with water it will, after a time, leave the glass in patches, not separating visibly or cracking; but if the sensitive plate be examined carefully by reflected light a peculiar light cloudiness will be seen in patches. Wherever this occurs there is no protection from blurring, and half the surface of the plate may pass into this condition in three or four days if the drying be very thorough.

There is another fault in annotta when used alone. If the coat be examined carefully with a microscope it will be found to be full of bubbles.

These faults I cure with glycerine. I use one drachm of syrupy glycerine to each two ounces of solid annotta, and water enough to bring it to a thick paste. If it dry too much between times add more water, but not more glycerine. The quantity of glycerine is always to be kept strictly proportionate to the quantity of annotta. I may probably have sent you the formula before, as I have used it many years, but have now to add that I recently developed some plates which had been made and backed about two years ago, and the backing had stood perfectly, neither peeling off nor cracking.

In a letter to the *Philadelphia Photographer* for March Mr. G. W. Simpson speaks of the idea of colouring the sensitive film itself as having originated with Mr. Cooper.* Many of your readers must be aware that I recommended this plan half-a-dozen years ago, and continued for a long time to be alone in advocating it. Having recently tried *coralline*, which has been strongly recommended for the purpose, I obtained most unfavourable results. Two plates were exposed—one an ordinary emulsion plate, the other coloured with coralline. Both received the same exposure; the ordinary plate gave a good printing negative, the coralline plate showed absolutely nothing but the sky line. A repetition of the experiment with a different collodion gave exactly the same result—the plain plate showed a full exposure, the coralline plate sky line only. I am now engaged in further experiments on this subject. M. Carey Lea.

SERUM DRY PLATES.

A Russian photographer, M. A. de Povorski-Jovavko, has written to the *Moniteur* on the subject of dry plates. He remarks that a whole host of substances have been used for preserving them, most of which give more or less satisfactory results; but this very variety proves that the desired end has been only partially attained. There remains yet something to be done. Some time ago M. Povorski had called attention to serum as a preserver of sensitised paper, having used it in that capacity; and he now again comes forward with his serum, but this time it figures as a collodion preserver, in which capacity it answers excellently well.

His method is in the last degree simple, and there is no trouble in choosing collodions to suit it; for any good collodion for dry-plate purposes will do, and it gives magnificent results with a simply-bromised collodion according to the formula of "*l'honorable* Sutton." The harmony of image obtained with the bromised film leaves nothing to be desired, and since the process was first brought under his notice in the *Moniteur* he has always used it.

He prepares his plates in the ordinary way, having first cleaned them by Mr. M. Carey Lea's method with bichromate of potash and sulphuric acid. An eight-per-cent. bath is used, and the plates are immersed in it about three minutes, after which they are washed in filtered rain water and, when drained, coated with a preservative of serum made in the following way:—About four ounces of skimmed milk are mixed with an equal part of rain water and set on the fire to boil. As soon as boiling begins from twenty to thirty drops of acetic, and rather less of citric, acid is added, when the milk at once turns. Having separated the caseine by filtration the albumen of an egg is added to the liquid, and after letting it rest for a few moments it is put on the fire and boiled again for a few seconds. After this the serum, thus clarified and filtered, should be put in a bottle with some lumps of camphor, and kept for two or three weeks in a cool place. This preparation costs so little that it is as well to have it fresh for each batch of plates.

* Mr. Simpson evidently overlooked the fact that Mr. Lea published this idea on May 1, 1868. Mr. Cooper first published it on August 16, 1872.—Eds.

The bromised collodion, we are informed, contains thirteen grains per ounce of bromide of cadmium; and the plate is left ten minutes in an eighty or ninety-grain nitrate bath. The plate is then washed in a bath of filtered rain water containing five minims per ounce of acetic acid. The plate is left four minutes in it, after which it is washed for a minute or two with plain water, also acidified if it should contain any carbonates.

Of the serum thus prepared four ounces are taken, to which about four grains of pyrogallic acid is added, and it is then ready for use. It is first poured over the plate to clear off the water from its surface, and then the plate is re-coated carefully, the fluid being allowed to remain on the surface for about a minute, when the film should be carefully washed. The plate may then be dried with the usual precautions. If the operations have been carefully performed the plates will keep for three months—perhaps longer.

One odd thing happened with these dry plates. After drying, striæ and blurrings often appear on their surface; but no harm comes of them, for they disappear on development. As M. Povorski remarks, the same fact has been observed before, and is possibly in some way due to the presence of milky matter in the serum or to albumen.

The writer then proceeds to give hints as to the exposure of the plates; but as these contain nothing new we shall not reproduce them here. The following is his formula for development:—

No. 1.

Distilled water	4 ounces.
Pyrogallic acid	4 grains.

No. 2.

Distilled water	4 ounces.
Bromide of potassium	30 grains.

No. 3.

Liquor ammonia	4 ounces.
Distilled water	4 „

And the order in which these mixtures are used is this:—About twenty minims of solution No. 1 is added to sixteen of No. 2, and the mixture is poured over the plate after it has been wetted under the tap. It is drained off and put on again two or three times, after which eight or ten drops of solution No. 3 is added, and the whole poured on and allowed to remain for thirty or forty seconds, when it is again poured off and on as before. The image appears at once after the ammonia has been added, and at each successive application it grows stronger. Should the development slacken, however, before all the details are out add a few more drops of the dilute ammonia. He then fixes the image in hyposulphite, and intensifies afterwards with—

Water	400 parts.
Pyrogallic acid	1 part.
Citric acid	1 „

To two and a-half drachms of this solution he adds eight or ten drops of six-per-cent. nitrate of silver solution, and uses it in the usual way.

Working in this way M. Povorski says he has never had a failure. The plan is so sure that an indifferent amateur may easily succeed in taking very passable plates by it with ordinary care.

THE ANTHONY PRIZES.

It will be remembered that we some time ago intimated that Mr. Edward Anthony, of New York, had, with praiseworthy liberality, offered prizes for a series of the best photographs specified as follows:—

1. $100 for the best bust picture of a lady.
2. $100 for the best child's head (boy), less than six years old.
3. $100 for the best child's head (girl), less than six years old.
4. $100 for the best group of two children under six.
5. $100 for the best landscape.

All the prints to be of the size ordinarily known as 4·4, or about $6\frac{1}{2} \times 8\frac{1}{2}$ inches, mounted on 10×12 inch cards.

From advance sheets of *Anthony's Bulletin* with which we have been favoured we learn that over one hundred photographs were sent in competition, and among them were some of very unusual merit all the way from New Zealand, and also some splendid landscapes by Johannes, of Partenkirchen, Bavaria.

The various jurors appointed—namely, Messrs. Coleman Sellers, J. P. Cook, J. W. Draper, H. J. Newton, and F. F. Thompson—having sent in their reports, the majority have determined upon the following awards:—

1. For the best bust picture of a lady, to J. Barhydt, of Rochester.
2. For the best child's head (boy), less than six years old, to F. Gutekunst, Philadelphia.

3. For the best child's head (girl), less than six years old, to F. Gutekunst, Philadelphia.
4. For the best group of two children under six, to Boissonnas, of Geneva, Switzerland.
5. For the best landscape, to Alexander Henderson, of Montreal.

It may be observed that one of the jurors decided Nos. 2 and 3 (best heads respectively of boy and girl) in favour of Mr. Abel Lewis, Douglas, Isle of Man; but by a majority the final decision was given as above recorded.

ON PRINTING AND TONING COLLODIO-CHLORIDE PAPER.

[A communication to the London Photographic Society.]

I have been invited by your courteous Secretary to write a short article describing the material and means used by me in printing and toning the pictures I had the honour of sending to the Society's Annual Exhibition last year. I had some difficulty in making up my mind to accede to Mr. Baden Pritchard's request, not because I wished to keep to myself knowledge of which others might not be possessed, but because I was under the impression that the members of the Society knew as much as I did on the subject.

Having, however, given a promise, I now proceed to redeem it to the best of my ability, by writing a short paper explaining my method of printing and toning collodio-chloride paper; and I only hope that something may be said that will induce the members of our profession to take a deeper interest in a process which somehow or other in this country, its place of birth, has never gained that practical footing it so well deserves.

Before detailing my plan of working, permit me to express my ideas upon the subject of artistic tone in its wider sense, as representing not only colour or tint in the photograph, but as embracing richness, depth, and delicacy of gradation in the negative also.

And here I may say in regard to tone or tint, in the usual acceptation of the term, I expected in the event of any notice being taken of the photographs which I sent to London that objections would be raised to their tone, as being too cold or black. The reason I had for expecting this adverse criticism was that the majority of photographers with whom I have conversed on the subject consider brown tones the most suitable for photographic prints; and, further, the work produced and sent out by the profession generally indicates a leaning to what are popularly called "warm tones."

Under these circumstances I was agreeably surprised to find that my pictures were favourably mentioned on account of their colour. My own feelings for some years have been in favour of black colours as better fitted to display the delicacy of gradation found in a negative; and consequently I have done everything I could to produce in my work the purple-black, as well as the transparency of a first-class engraving, being convinced that the nearer I attained to these two qualities the more artistic would be my pictures.

My predilection in favour of this tone rests upon the fact, in the first place, that the artistic world, both in the past and present century, have adopted a blue-black ink upon a white ground as the most effective and pleasing tint for pictures in monochrome.

They were perfectly well aware (as we are ourselves) that neither a brown nor a black ink could represent colour as seen in a painting; but between the two they chose the latter as the best medium through which to show the wonderful power of the artist-engraver in rendering the semi-transparency of flesh and texture of fabric by the skilful use of light and shade alone.

The second reason I give for preferring a black to a brown tone is that I believe the delicate shadows which lie just beneath the highest lights of the picture receive more beauty and value when the photograph is toned deeply than if the toning had been stopped at an earlier stage.

The gamut or scale of gradation at our command is more limited than that of the painter, and we require, therefore, to husband our resources all the more carefully, so as to make each degree of gradation tell in our finished work; and if we can extend, or at least make more visible, these gradations by toning past the brown to a rich black, then by all means let us do so, as the essential spirit of a photograph lies in its pearly half-tones.

[Mr. Bruce illustrated his meaning by reference to musical art and artists.]

Without the middle tints we may have a bold, clear, glaring picture, with its startling effects of strong contrast, but of which the eye soon grows weary, though it may have been arrested for a moment; while with the addition of a cool grey tone, filling up the picture between the highest lights and deepest shadows, modelling and transparency are at once imparted to the whole, and a picture full of tenderness and beauty is the result. While our foremost men are aiming in their portraiture to produce the breadth of light and shade seen in the works of great painters, and while in many instances they succeed, yet, in my opinion (and I give it for what it is worth), a large proportion of the so-called "Rembrandt" portraits are complete failures for want of gradation or middle tone. It behoves us, therefore, in seeking after higher and broader effects in our work, never to omit the half-tone, as otherwise heavy, lifeless portraits, with hard staring faces, will be the outcome and conclusion of the whole matter.

[Reference was here made by the author to the effects of *chiaroscuro* introduced by Sir David Wilkie into his picture of the *Clubbists*.]

The cultivation of this taste for combining the delicate with the deep, and high lights with half-tone, ought to be the aim of all photographers, as the forward movement of our art depends so much upon it; and just in proportion as the members of our profession exercise this faculty, by using the legitimate means at their disposal for giving gradation and modelling to their pictures, so will their work rise to a higher level and claim a larger meed of praise from those men whose opinions are worth having.

No doubt we are "cribb'd, cabin'd, and confin'd" in the production of art-pictures, by the unbending nature of the materials from which we make them; but then there is hope that in the future, and perhaps at no great distance, some one will give us a developer so rapid in its action that those phases of expression we so long to get impressed upon our plates, and which, if once there, would give so much artistic value to our work, will become a possibility.

I would not forget that through the kindness of Mr. Faulkner the profession has now within its reach the invaluable power of giving breadth of effect and artistic gradation to the background of their pictures, and that without excessive labour; and although it is to be regretted that so few have as yet availed themselves of this great privilege, I cannot but believe that the profession generally will, ere long, come to look upon this method as a great help to securing beautiful pictures.

I may say here, with regard to my photograph "188," of which "the judges" expressed approval in their published report, that in my opinion the artistic merit, and what was termed "its perfect illusion," is in great measure due to the use of one of Mr. Faulkner's graduated backgrounds.

When imitating the qualities of a fine engraving we must not trust to toning baths alone, but do what the engraver does—put the tone into our plates, not by aid of lead pencils but with pencils of light direct from Sol himself; and, assuredly, if an intelligent mind guides and controls these rays of light in the same way or sense as the engraver guides his graving tools, all other things being equal, results will be obtained, in their technical qualities at least, fit to be compared with the finest engraving extant. No remodelling of the negative in the sense that many photographers mean it to be understood, if we are to judge by their work, can ever give that rich tone so peculiar to a well-lighted and carefully-developed plate, even though the pencil be under the guidance of a Fritz Luckhardt.

A number of photographers who write in favour of retouching (or remodelling, as it is sometimes called) assume that artistic feeling and truthful representation must always be added to the picture after, and not before, the plate is taken!

Now I, for one, demur to this view of the case, and do not hesitate to say that this theory is damaging to the person who holds it, as well as to the profession of which he is a member. I do not think I am alone in believing that, unless artistic feeling and truthful representation is impressed upon the *subject* before the negative is taken, the most elaborate retouching afterwards will not supply the want. I quite agree with Mr. Blanchard and others that retouching is legitimate in the way of correcting any slight mistake when it occurs; but I am more and more convinced that the best negatives made are those which require the least work to make them ready for printing. And if this holds true in regard to particular plates, why should we not devote more time and greater skill to make all our negatives so perfect that little or no correction shall be needed to make them produce truthful and pleasing pictures? By doing so character will be retained, the friends of the sitters will be better pleased (although the sitters themselves may not), and, not the least important, our art will be more respected and trusted in the future than it is likely to be if this frenzy for remodelling continues. I would sooner have the photograph of a dear friend taken by the merest tyro in the art than have one with all the character rubbed out, even though it should be pronounced a "pretty picture!"

To secure this artistic softness in our plates, which is so much and so justly sought after, we must give them a very full exposure, so as to get out the minutest gradations both in the dark and light parts of the picture, leaving no more clean glass than is just needed to give depth and value to all the rest of the gradations above.

The negative must, through skill in lighting, timing the exposure, and developing the plate, be filled with tone, before we can get that delicious suggestion of flesh-tints in our portraits, and atmosphere in our landscapes, which pervades and fills to such a wonderful degree the works of eminent engravers!

I believe I am correct when I say that, however much we may differ regarding what should be the tint of our photographs when finished (a point on which difference of opinion may be held without materially affecting the intrinsic value of our work), most of us are at least agreed on this, that no tone or tint, however rich, will make up for a bad negative. Further: that delicacy and technical perfection in the negative will not atone for the want of that knowledge and refined taste which grasps the idea and arranges the subject so as to make the best picture that can be secured out of the material we may have at our disposal.

There is no doubt that if all the members of our profession aimed at a higher standard of negatives, there would be less boasting of the number of plates taken in a given time, and more thought and skill expended to make a few good ones. But it may be asked, "What about the exchequer? How can money be made by a professional photographer, and honourable retirement from business looked forward to, if we do not 'push the trade?'" All I can say in answer to this question is that the taking of fine photographs cannot be thought of in the same way as a trade in groceries! What would "Wilkie" have given to some of his patrons, had he measured his work by the paltry sums of money he got from them? The gentlemen who made the terms would have been rightly served had the artist given them bare value for their money; but in doing so the world would have lost treasures of enduring delight, and the name of Wilkie as a great painter would have remained for ever unknown! I believe that no photographer can devote sufficient time and skill to the execution of his work whose mind is constantly running upon £ s. d.; and while it is imperative that we should be able to live as well as merely to exist, yet our gains should not be secured by producing quantity so much as quality, charging in ratio to the efforts put forth.

The photographs I sent to the Exhibition were, as I said before, printed upon collodio-chloride paper prepared by Herr Obernetter, of Munich. That gentleman has supplied this paper to photographers for some years past; and as ever since he began to manufacture the material I have used it, I have acquired considerable experience in working the material.

For the first year or two I found great difficulty in printing my work upon it; but the faults inherent in the paper at that time—such as the tendency of the film to peel of when the prints were immersed in water, the hard, horny character of the film itself, which cracked so easily that it was next to impossible to pass the prints through the toning and fixing baths uninjured, the want of sufficient silver on the films to give depth and richness to the shadows—have been entirely overcome. The material now sent me is on the whole very good, although in some samples the paper on which the film rests is too thin to support it, so that when the prints are wet they curl up into tubes, and consequently require more care and skill in handling to get good pictures than they do when the films rests upon a thicker basis.

To show, however, that good prints, free from stains and cracks, may be secured upon the thinnest sample of collodio-chloride paper, I may mention that the photographs exhibited by me were printed on such samples.

In dealing with this paper I avoid printing too deep—that is, scarcely so deep as when using albumenised paper—as the prints lose but little of their depth in passing through the fixing bath. The paper requires great care in handling; when cutting the sheets ready for printing upon, and when examining the progress of printing when in the frames, I find that the finger touching the sensitive surface for a moment is sure to cause a stain when you come to tone the prints. The paper will keep good for days between printing and toning—a property, no doubt, useful at times, when one is busy and cannot get the day's work toned at night, or when dull weather sets in and printing goes on slowly. I am impressed, however, with the idea that this merit in prepared sensitised papers should be taken advantage of as seldom as possible, as I am convinced that the taking of silver prints out of the frames and laying them aside for days or weeks before finishing is an arrangement not conducive to improve their appearance, but rather the reverse.

It is, I believe, generally admitted that a wet or dry plate cannot be developed too soon after exposure; and if this hold true with sensitised plates, the same follows with sensitised silver paper when once the light has acted upon its surface. This being my opinion, I do not care to keep my prints any longer than need be before they are toned.

My toning bath is made as follows:—

Stock Solution. No. 1.

Sulphocyanide of ammonium	1 ounce, 2 drachms.
Distilled water	50 ounces.

Stock Solution. No. 2.

Gold	35 grains.
Distilled water	50 ounces.

Fixing Bath.

Hyposulphite of soda	5 ounces.
Distilled water	30 ,,

The gold I use for toning is prepared according to Colonel Stuart Wortley's formula, given in the *Year Book* for 1871, page 91; and it gives in my hands more uniform results when toning collodio-chloride paper than I ever obtained with the ordinary commercial samples of chloride of gold. Why I cannot tell, any further than that in preparing your own chloride of gold you know exactly what you have at hand, and the strength of the toning-bath is more under your control.

This "control" is absolutely necessary to success with collodio-chloride papers, as I find that any thing more than the strength given in the formula produces a flat, eaten-out picture, without any depth, while, on the other hand, too weak a toning-bath gives heavy, opaque, brown tones.

Thus, if the toning goes on too quickly, you lose depth and richness; if very slowly, a brown leathery tone is produced, which is far from satisfactory.

The reason in the first case is that the prints pass so rapidly from brown to black that, before you can well get them removed from the bath, the point where richness lies is often lost.

And, in the second place, the sulphocyanide of ammonium solution in some measure destroys the transparency and purity of the prints when they are left too long in contact with it. Particular care and attention must therefore be given to the toning-bath, so as to have it neither more nor less than the strength stated, as collodio-chloride photographs are much easier stained in toning than prints upon albumenised paper; and when unequal toning does take place, it is more visible in the former than in the latter.

In making up a bath equal quantities of Nos. 1 and 2 are mixed, plenty of chalk being added, letting the whole stand for from three to five hours before use.

With some samples of this paper the bath can be used at once; but with other sheets this is not the case, a deposit of gold taking place over the whole prints, and destroying the purity of the whites.

It is better, therefore, to err on the safe side by making up the bath a considerable time before it is required, and thus be assured of having a uniformity in one's photographs.

When I have many prints to tone I use two flat dishes capable of holding, say, a dozen prints each. I filter the solution into these dishes to the depth of one-fourth of an inch; were the liquid deeper the prints would not keep flat.

I wash in three changes of water; and as the prints generally curl up into tubes I open each of them separately in the water, so as to get the surface uniformly washed. If this be not done, and done in each separate dish of clean water, uneven toning will be sure to take place.

When the prints have been properly washed with a quick but gentle movement, I open up each picture and lay it flat in the bath, face downward; and when the dish is full I begin at the first and turn it over, brushing the face with a camel's-hair brush, and continue the process until the whole have been so treated, afterwards turning them back again into their former position, and so on without cessation, until the prints are ready to leave the bath. When stains occur in the course of toning lift the print out of the solution, dip the brush in alcohol, and rub the spot slightly; then immerse the print again, when it will be found that the stain has disappeared and the print has been saved.

When fixing the prints the same care is required in laying them separately in the fixing solution, toning them over, and keeping them in motion until they are fixed, which is completed, when the fixing bath is new, in two or three minutes.

When removed from the bath, the prints are immersed for a few minutes in three or four changes of water, and put under the tap for an hour or two.

The water is then shut off, and they are left all night and throughout the next day until the afternoon; the water is changed now and again. The prints are then trimmed and mounted.

The system in use amongst many of the profession, of cutting the prints to the exact size wanted before turning them, cannot be readily adopted with collodio-chloride pictures. In their case the paper should always be a little larger than is necessary, allowing not less than one-eighth of an inch to be cut off all round after the prints have been toned, fixed, and washed. The reason for this is that the edges of the prints are very curly, and the film becomes frayed in the course of washing; by cutting away this frayed curly part they are more easily and neatly mounted. As it is impossible to lay these prints upon blotting-paper and dry them in a flat state without cracking the surface, another method has to be put in practice for the purpose of trimming them. I use a piece of thin plate glass cut to the exact size of what the *carte-de-visite* print should be, the edges being ground and the corners slightly rounded, so as not to scratch the picture. If the prints are more than ordinarily curly I open them *underneath* the water, and lay the sheet of glass upon the face and then lift both of them out of the water at once, the moisture between the two enabling me to move and adjust the glass over the print with the greatest ease. I then with a pair of long-bladed scissors cut along the four edges of the glass, and thus secure a straight, clean-cut print, without damaging the surface of the photograph.

The medium I use for mounting is starch, carefully boiled, as thick as possible. It is, while still warm, poured into the centre of a muslin cloth, the corners of which are drawn together and held firmly with the left hand, while the right hand presses the bag and causes the pure starch to exude through the interstices of the cloth—the result being a paste perfectly free from gritty matter, and of the right consistence for mounting.

A sheet of thick plate glass is covered with a damp cloth, and the prints are lifted from the dish and laid upon it in a wet condition, the water on the face of the prints and the damp cloth preventing them from curling. They are then pressed quite flat with another cloth, and dried before they are starched.

After the prints are mounted, dried, and spotted out, I roll them upon a hot steel plate; they are then put up in dozens into paper and laid upon the machine plate, and when warm are rubbed over with "Solomon paste," which gives them a richness and transparency they would not otherwise possess.

If desired, these photographs may very easily be covered with "Mawson's print varnish" or "enamel collodion" by coating them with a camel's-hair brush of the same breadth as the card. In my own practice, however, I rarely varnish the pictures, as I think they are more beautiful and artistic when simply finished with wax paste.

And now I have brought to an end my remarks on the production of collodio-chloride prints; but I cannot close this paper without expressing my regret that so valuable a method of printing, given so generously to the profession by Mr. G. W. Simpson, should have been so little practised amongst us, considering the beauty and delicacy of its results. I must also express my surprise that the manufacturers of photographic papers in this country should still leave those of us who wish to print our work by this process to get the material for the purpose from the continent.

The distance it has to travel has been, and must always be, a drawback to its general use, and especially in warm weather. Meanwhile, until a manufacturer be found in Britain who will make a first-class collodio-chloride paper, those desirous of trying the material may obtain it of good quality from Herr Obernetter, of Munich. As I am particularly anxious that this method of printing should have a fair trial—and past experience has shown me that it is of the utmost importance that the printer should receive the paper direct from the manufacturer (for only in this way is full justice done to both)—I have written to Herr Obernetter requesting him to supply small parcels to any gentlemen desirous of making experiments in this direction. GEORGE BRUCE.

Contemporary Press.

ERRORS IN THE STUDY AND PRACTICE OF PHOTOGRAPHY.

[PHILADELPHIA PHOTOGRAPHER.]

HAVING in a former article shown a few prominent errors which prove detrimental to success, I will now endeavour to point out some that many photographers are daily committing for which there is not the least shadow of excuse.

In many galleries claiming to be first-class there are many *poor* negatives produced, when *good* ones might just as well have been secured. Photographers, when there are several customers waiting, exhibit too plainly to their sitters their anxiety in hurrying them off for the "next." Often the sitter is informed that the negative is "splendid" (?), and is requested to call the next day and see the proof, at the same time the operator knows that the sitter "moved," or that the negative was not sharp, and was defective in general; but then he reconciles himself by the fact that there are others impatiently waiting, and that he is sure of his customer, because his rule is "payment in advance." This is very poor logic; for, on the other hand, the customer returns, and finds in the proof such an abortion that he immediately concludes the photographer is *not* such a master of his art as his imagination had pictured. Many see directly how the case is: they were rushed through—sacrificed, as it were, for the benefit of another subject.

Another time the operator scrutinises the negative and discovers several imperfections, thinks of the wonderful *hiding* power of the "retouchist," and with an inward chuckle exclaims, "All right!" Oh! what a multitude of sins (photographic) retouching covereth!

Let us consider the negatives have been carefully varnished, free from dust, the backs cleaned off, and delivered in first-class condition to the printer—which is hardly ever the case. Generally the printer has more frames than he can properly attend to, and a boy is given to him as an assistant (?). Cloudy weather has caused them to be behind with the printing, and the first bright day they strive to find how many sheets they can "print up," valuing the day's work by the number of sheets used instead of the perfect prints secured. They examine their prints, vignettes and all, by opening the frames for inspection, so the direct rays of the sun fall on them. Not from ignorance is this done, but from carelessness and unconcern. The prints are then hurriedly washed; and as the printer is bound to get through by six o'clock, having, perhaps, printed until nearly five, his toning solution is made double the strength it should be, and, to use a printer's phrase, he "slaps 'em in" and "puts 'em through." If his toning bath begins to show any propensities for slow toning, without removing the prints from it, he adds another dose from a solution of a strength unknown to any of the modern, aye, or the ancient, formulæ. The prints, of course, come out as various in tones as there were different shades in the printing—many over-toned, vignettes dingy-looking, and no brilliancy in any of them. Who gets the blame? Not the printer, for he has an excellent reputation—is a first-class printer. Ask him, "Why is this thus?" and he will reply, "Paper's bad; something's the matter with it; it must be old," &c. To the stock-dealer is consequently despatched a letter, elevating him in a "balloonish" manner for sending such trash. Stock-dealer is astonished, for he has just with the same mail received a letter from another party speaking in the highest terms of praise of the same paper, and containing an order for a ream of it.

There is in printing great chances to display discrimination, to exhibit skill and good artistic taste and judgment. Leave a good operator to the mercy of a careless, indifferent printer, and in a short time his reputation is gone the way of the woodbine. It is the little things in photography that must be noted and observed. Rules and regulations must be known and followed in all their minuteness, simple as some may consider them. Guesswork and thumb measurement is never adopted by a wise photographer. Perhaps some of my readers may remark, "We all know this." "Jess so!" but how many *heed* what they know?—because they have the knowledge are inclined to consider they can perform certain requirements or not? Their (in)discretion, indifference, egotism, heedlessness, or whatever it is—I confess I hardly know what to consider it—allows them to neglect with impunity some of the essentials which in the final result are sure to end in failure.

Then, again, the chemicals are to blame. No matter what degree of trouble the photographer may meet with the fault is inevitably laid to the chemicals; *he* is never (?) in error. I have known instances where impure water was used in making a negative bath, and, because it did not "work," the manufacturer of the nitrate of silver used was proclaimed dishonest, and the silver worthless, without any attempt whatever to investigate. Other chemicals are often similarly condemned, where imperfect washing of dishes, graduates, &c., is the real cause of trouble. Both expense and labour might be saved did the printer tone only such prints as he knew would be worth mounting; but, generally, so anxious are they to show a day's work by the number of prints that prints both too light and too dark are toned. Often all are cut out and mounted before any examination is made, and imperfect ones thrown out, resulting in both a loss of time and material.

Even in mounting and cutting out photographs they can be spoiled. There is a rule for cutting out pictures which, of course, all know; but I have seen, coming from galleries that boasted of artistic perfection, cards cut out with heads sometimes in the centre, then close to the top of the card, and entirely too far down. Often the very pose the operator has taken such pains to secure is totally destroyed by the print being imperfectly or improperly cut out and mounted.

There is an adage which reads, "Make men intelligent and they become inventive." The more a photographer learns about his profession the more convinced will he become that, although he has not, perhaps, considerable knowledge, what he does not know is the *most* important. During cloudy weather, or dark days and stormy ones, is the time to study and "read up;" or, as Captain Cuttle says, "overhaul your cargo," clean up, rearrange, and attend to things which the bright and busy days may have caused you to slight, neglect, or let accumulate. The best rule to have posted in all departments of photography is—MAKE HASTE SLOWLY. GEORGE O. BROWN.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 28	Liverpool Amateur	Free Library, Wm. Brown-street.
,, 30	Oldham	Hare and Hounds, Yorkshire-st.

LONDON PHOTOGRAPHIC SOCIETY.

WE this week conclude our report of the meeting of this Society held on the 14th instant, the first portion of the report of the proceedings having been given in our last number.

A paper *On Printing and Toning Collodio-Chloride Paper*, by Mr. George Bruce, of Dunse, was read. [See page 196.]

A number of *carte* portraits, executed by this method of printing, were handed round for examination.

The CHAIRMAN (Mr. Spiller) said that Mr. Bruce had made this method of printing largely his own, he being the only artist working with it in this country. It was unfortunate that the method of preparing Obernetter's paper, which was used by Mr. Bruce, was not divulged; but Mr. Bruce himself was entitled to their thanks for his communication.

Mr. HOOPER had been much delighted with the results of the process, which he hoped would be taken up by the members of the Society. He should hail the day when they would get rid of albumenised paper. The collodio-chloride process was a little difficult to work, but that, doubtless, would be overcome.

Mr. WHITFIELD found that collodio-chloride pictures were quite as liable to fade as prints on albumenised paper. He had printed pictures on a film of collodio-chloride which had afterwards been transferred to ivory, and notwithstanding the greatest possible care had been taken they had faded.

Mr. T. SEBASTIAN DAVIS described how, in order to obviate the sinking of the collodion film into the paper, he had applied it upon ordinary albumenised paper. The tone was very rich after being printed, but it lost that richness after toning and fixing, and sunk to a dull, slaty hue.

Mr. B. J. Edwards said that by immersing the prints in alcohol they would be found easier to tone. He did not think, however, that photographers would ever go back to collodio-chloride again; for, while prints by that process were as liable to fade as those on albumen, they were also liable to have the surface abraded. Something more permanent and beautiful was wanted.

Mr. F. W. Hart observed that it had been stated by Mr. Bruce that the production of the paper had not been taken up by the manufacturers in England. He could answer for the trade; they had found such difficulties in the way of making it that they had discontinued its preparation. Methylated alcohol had to be used in manufacturing it, and the fumes from that preparation were offensive and deleterious to health. As to the permanence of prints on albumenised paper, they would hear less of their fading if photographers would only be more careful in fixing them according to the principles laid down by their Chairman.

Mr. Jabez Hughes referred to leptographic paper, with which he had had a great deal of experience, and expressed his honest belief that pictures on that kind of paper were more beautiful and permanent than those on albumenised paper. "Why not, therefore, use it?" he asked. Simply because there was no end of troubles in connection with it—troubles that an ordinary printer would never overcome. He had seen Mr. Bruce work the process; but, after noticing the excessive care required in connection with it, and the difficulties with which it was beset at every stage, he had concluded to have nothing to do with it.

Mr. Henderson condemned the process on account of its fading tendencies. He had found collodio-chloride pictures to fade even when they were hermetically sealed in glass tubes.

After some further observations it was suggested by the Chairman that the subject might advantageously be brought forward again at the following meeting, to be held on the 12th prox., the more especially as Herr Obernetter was then to exhibit some negatives obtained by the powder process.

[Particulars of the latter process, we may observe in passing, have recently been published in The British Journal of Photography.]

Mr. Hooper was requested to prepare a paper for that occasion on collodio-chloride, and Mr. Henderson was requested to bring the specimens of fading to which he had referred. The meeting was then adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on February 14, 1874,—Dr. Vogel in the chair.

A discussion arose as to the methods of producing the Dernier effects, and various members detailed their experience; but there was nothing sufficiently new presented to demand reproduction here.

Herr Pflüger, of Dresden, forwarded some blistered albumen prints for the inspection of the members, and remarked that, according to his experience, those prints longest in the gold bath were the most spotted; but, on the other hand, a gold bath made with acetate of soda did not show any signs of causing the prints to blister.

Herr Marowsky doubted whether facts bore out this last assertion of Herr Pflüger, and had found the best remedy for blistering to be a gradual weakening of the fixing solution in which the prints were put. They were removed first, not into simple water, but into weak hyposulphite.

Some interesting specimens of reproduced negatives had been forwarded by Herr Obernetter, of Munich, on which the Chairman commented in very favourable terms. Some of them were made by the dusting-on process. Two-thirds of the lichtdruck pictures done by Herr Obernetter are produced by this process, of which Dr. Vogel gave an outline. A solution is made consisting of—

Gum	6	parts,
Chromate of potash	2½	,,
Grape sugar	4	,,
Water	72	,,

and with this a plate is coated. When dry the film is exposed under a negative, the exposure being regulated by a photometer. The film is quite sticky and holds powder-colours fast, but with exposure that stickiness is lost in places where the light has touched it; hence, when dusted over after exposure, the plate takes on the coating of powder in those places where the film has been covered, and gives an exact reproduction of the negative. Thus a negative is obtained from a negative.

Herren Reichard and Marowsky did not think the reproduced negatives were equal to the original. Others, again, gave the warmest praise to the results; and in particular

Herr Schaarwachter said that the difference between a print from the original and from the reproduction was so slight as to be hardly noticeable, and any defect in the latter was easily removable by a little retouching.

After some further remarks in the same strain from the Chairman and others, the meeting was adjourned.

Another meeting of this Society was held on February 21,—Dr. Vogel in the chair.

Various presents of excellent photographs were received for the Society's collection, which elicited many expressions of thanks and commendation from the members. A number of cabinet and whole-plate pictures in particular, by Herr Fechner, were ordered to be kept in the meeting-room permanently for members' inspection, and not relegated to the obscurity of the albums.

Many persons wanted to know why it was, seeing that lichtdruck pictures were so excellent, they were so little used in ordinary photographic productions.

The Chairman said that the results were not yet quite equal to silver printing, and the lichtdruck was dearer in proportion as well, while it was not so easily worked as the other. He further proceeded to give some account of the employment of gelatine, instead of collodion, with dry plates, and said that the idea of such emulsions was an old one. He, moreover, held gelatine to be a much more variable product than collodion.

Herr Hartmann exhibited four pictures to the meeting—two taken from an original negative, and two from a reproduction after Obernetter's method, which showed very little difference from the original; and some details were afterwards given of the exact method which Obernetter employed. He, it seems, exposed in the light of a magnesium lamp. The plate was breathed upon a little after exposure, and then dusted over with "English red."

The Secretary showed a picture with singular streaks upon it, and wanted to know the cause. Most of the members agreed that it was some defect in the albumen.

The conversation then drifted into the question of facilities for negative retouching, which were lacking in Berlin, and which some gentlemen professed their willingness to supply; and from that to a dissertation by the Chairman on the value of photographic schools generally—not merely a school for chemistry and technicalities, but for art and modelling, posing and lighting, and, in short, photography in all its departments. That schools of the kind might be of very high value is probably true, but the practical is usually best learned by practice.

With the Chairman's remarks the sitting closed, and the meeting was adjourned.

Correspondence.

Action of Silver Nitrate on Wet and Dry Sensitive Films.—Printing Baths.—Chloro-Bromide Albumen Process.

There is something very obscure in the action which a silver solution exercises upon a sensitive film in slowly impairing its sensitiveness. Generally this is, I think, ascribed to the formation of iodo-nitrate of silver, and in some cases, no doubt, that explanation is correct enough. Some years ago I tried the following experiment, which I do not think I have ever published:—To keep a wet plate over for a length of time I made it on the concave side of a slightly-bowed piece of glass, and, when sufficiently immersed in the bath, I adapted a piece of very thin, fine, pure white plate glass in the front of it, so as to include a thin film of bath solution, but no bubbles. I then cleaned the exterior surface of the plate glass, intending to expose through it, putting a similar piece of plate glass under my ground glass, which was removable, to adjust the focus. But this method proved not to answer as well as when the film was exposed; it deteriorated faster.

A curious experiment which I also made was to plunge a prepared wet plate into a very dilute silver solution—a portion of ordinary bath solution diluted with ten times its bulk of water—and in this the plate was left for twenty-one hours. It was then exposed and an iron developer applied; the result was that it fogged without a trace of an image.

Some will say that this was because in both these cases all the soluble bromide was removed, and that the fogging was thus caused. To test that, another plate was washed under a tap until every trace of anything soluble was gone. Probably fifteen minutes would accomplish this. But, to make sure, the plate was kept under the stream for an hour and a-half. It was then re-dipped in the bath. Certainly there was not a trace of soluble bromide in this plate. It was exposed, developed, and gave a clean picture.

The bearing of these experiments upon the emulsion process is tolerably evident. First, the silver bromide is formed. This reacts (as I lately showed) upon the collodion, the emulsion gaining greatly in density. Then the free silver nitrate reacts upon this again and gradually diminishes the sensitiveness. It does not seem to destroy it; for old emulsions made with excess of silver are still sensitive, though less so, and do not work clean. According to my experience this injurious action is complete in a few days—three or four—after which it does not further increase. A specimen of emulsion three months old did as well as one three days old—of course, both badly.

Printing Baths.—I am satisfied that a great many photographers are making a serious mistake in their printing by using too weak baths; at least it is so in this country, and this is in part indirectly caused by the using of ammonia fuming. This method, first proposed by Mr. H. T. Anthony, enables one to get a very much better print with a moderately-strong bath than can be got without it. It is, in my opinion, a very great improvement, giving always a better print than when omitted, and with weak baths the difference is something remarkable. It also shortens the exposure materially, and, in a word, it has but this one disadvantage—that paper fumed in the morning should be printed, toned, and fixed the same day, as the paper cannot be well kept over night.

The very great improvement which this method gives to prints made on a weak bath has tended to encourage the dilution of the bath to an injurious extent, because there is always too much disposition to do work merely good enough to pass muster, and to execute that as cheaply as possible. So many will print on a thirty-grain bath, or, rather, on a nominally thirty-grain bath, beginning with that, and running down still lower in use; and many will affirm that such a bath will give as good a print as a negative is capable of yielding. But it is not so. I have compared the results of such printing in the hands of an excellent professional photographer with prints from the same negatives made with a fifty-grain bath, followed by fuming, and the difference was conspicuous.

It is curious how often the relative effects of sun and shade printing are misunderstood. In a very good photographic text-book there is to be found a statement that hard negatives should be printed in the shade and soft ones in the sun; and the same mistake has attracted my attention in an article lately published in a photographic journal—an article expressly devoted to explaining the difficulties of printing and toning. The truth is, of course, the reverse of this. A powerful light will force its way through thick deposits that a weak one cannot penetrate. If a hard negative be printed in a very weak light nothing will be found on the paper except the dark shadows; the dense parts of the negative will not print with any length of exposure. Therefore, the rule is—the stronger the light the softer the print.

This matter is one of very great importance, for the principle involved in it runs through every operation of both negative and positive work. It is for this reason that the less sensitive dry plates tend to give hard negatives—the weaker lights cannot make their proportional effect; and for the same reason a longer exposure in the camera does not make up for a weak image. If we find that with a given stop—say a third of an inch in diameter—we get a good plate with an exposure of one minute, we will find that we cannot obtain as good a result by an exposure of nine minutes with a stop of a ninth of an inch diameter. It is certain that the latter allows one-ninth as much light to pass, but this weaker light will not produce as strong an impression by merely continuing it nine times as long. It is true that Dr. Vogel has lately called this principle in question, and, after careful experiment, affirms that the same result is obtained with a weak light as with a strong one, providing the exposure be proportionately increased. But I think the experience of photographers generally is adverse to this view. If it were true, then we might reason back from it to positive printing, and expect that a negative could produce the same result in a weak and a strong light, provided that in the former case the exposure was proportionately extended. But this result we certainly should not obtain, nor should we, I think, in the case of the camera image. The principle is the same in both, but in the positive printing we can make the comparison with more ease and certainty.

Albumen Applied to the Emulsion Process.—The addition of albumen to the preservative in the emulsion process which I have lately proposed in your columns will, I think I may venture to say, be adopted by most of those who will give it a trial. Those who have made a speciality of the various dry processes in which albumen is used have hitherto held aloof from the emulsion process as not giving equally good results; whilst those who use my form of the chloro-bromide process with excess of silver nitrate reject the collodio-albumen process as too slow. The combination which I have sent you removes the objection on both sides. We obtain the peculiar influence of the albumen without losing the high sensitiveness of the other process. I am continuing my experiments with a view of ascertaining whether further improvement can be obtained. I have at this moment a considerable number of experimental plates waiting exposure, and hope in a week or two to send you farther results. M. CAREY LEA.

Philadelphia, April 6, 1874.

M. VIDAL'S TREATISE ON PHOTOPOLYCHROMY.—M. LIÉBERT'S NEW TREATISE ON PHOTOGRAPHY.—THE SERUM DRY PROCESS OF M. JOBAVKO.—CASEINE, ALE, AND PYROGALLIC ACID AS ORGANIFIERS.

IT is a long time since I heard from M. Vidal on the subject of his new process of printing photographs in colours; but a circular has lately been distributed amongst French photographers, by MM. Cayer and Co., printers at Marseilles, to the following effect, viz., that they have arranged to print and publish M. Vidal's treatise on his process, entitled *Traité General de Photographie au Charbon et de Polychromie Photographique*, but that, owing to the number of illustrations of the processes which the work will contain, only a limited number of copies can be published; for a hundred copies only will require four thousand proofs, each of which will have to be printed by a separate exposure to light. MM. Cayer and Co. therefore propose to intending subscribers to the work to forward to them the price of it, viz., twenty-five francs, in advance, and they will then receive their copy sooner than by waiting until the entire edition is completed. Those who pay their subscription before July 1st will be privileged to receive their copy for twenty francs.

The above arrangement seems reasonable, as being the only one by which the author can be guaranteed against absolute and, perhaps, serious loss through his laudable endeavour to publish complete directions for working his interesting new process in all its ramifications and details. It is the illustrations which are costly, not the text; and thus, by the method proposed, all parties will be equally secured against pecuniary loss, since no more copies will be printed than are actually subscribed for. There can be no doubt that the work will be a highly-interesting and instructive one, and will possess considerable novelty. With respect to the probable utility of the process commercially no one can as yet form any accurate idea, and we must be on our guard against prejudging it; but it will have to encounter some formidable rivals in the new methods of colouring photographs which are now upon the *tapis*.

A circular has also reached me of another new work on photography—or, rather, a second edition, much enlarged, of an old work—entitled *La Photographie en Amerique*, by M. A. Liébert. It is described as a very handsome volume, containing 500 pages octavo, and copiously illustrated, not only with woodcuts, but with photographs by the Woodbury and collotype processes. There are four specimens illustrative of a mode of lighting *à la* Rembrandt, and two specimens showing the value of retouching the negative. The author's new process of enlargement is minutely described; also the method of printing in fatty inks, making photo-enamels, transferring the film, &c., &c. The work also contains an illustration, as well as a description, of M. Rousselon's method of photo-engraving.

And here I may observe that, in speaking of the latter process as M. Rousselon's, no injustice is ever intended to Mr. Woodbury. Every one knows that it was he who discovered the *principle* of the process, and that to M. Rousselon only belongs the merit of having worked it out and improved upon it in some of its details. We speak of Rousselon's process just as we should speak of Fothergill's process or the Blair-Adams process, without constantly lugging in the name of Talbot or of Archer as the original discoverers of the principle or leading feature of the said processes.* That is always implied, though not expressed; and Mr. Woodbury can afford, I think, to be a little less sensitive than he is at his name being omitted when he reflects how other inventors are constantly being served in the same way in similar matters in all branches of art and science. M. Rousselon has himself told me that his modification of Mr. Woodbury's process consists in his adding to the bichromated gelatine, not a coarse, insensitive substance like sand, as proposed by Mr. Woodbury, but a substance which is

* Mr. Sutton appears to lose sight of the fact that Mr. Woodbury's claims rest not upon the discovery of the principle but upon the application of the principle; and until M. Rousselon chooses to publish the details of what he terms *his* process, we cannot recognise his right to the position in which Mr. Sutton would place him, but must regard the method adopted and successfully worked by M. Rousselon as Mr. Woodbury's invention, which has been described, worked, and patented by the inventor.—EDS.

sensitive to light, and which gives a degree of grain to the film in the exact proportion in which light has acted upon it. What this substance may be is his secret, but the modification is sufficiently important to justify him in calling the process by his own name. At any rate, his having done so is borne out by a hundred examples of a similar kind which must occur to every one who is familiar with the history of our art. Even patents have been taken out for various photographic lenses, and the name of the patentee assigned to the instrument, when the principle of it has been discovered and published years before.

A new dry process* has just reached us from the Gouv. de Tschernigow, Mgline, Russia, the author of which is M. A. de Povorski-Jobavko. This gentleman has described it in a very sensible and practical manner, and I am the more gratified at his success with it because it is but a slight modification of my own recent version of the bromide process with the bath, which I have published in the *Moniteur* and in the *Bulletin* of the Photographic Society of France. His formula, in fact, only differs from mine in the nature of the preservative, which is serum of milk instead of albumen. He is most enthusiastic about it, and says that no skilful operator can fail of hitting the bull's eye at the very first shot. It is not the first time that this gentleman has appeared in print in the pages of a French photographic journal; for in 1869 he published in the *Moniteur* a description of a paper negative process with serum of milk.

It is most gratifying to me to find that the bromide process with the bath is gradually making way amongst continental photographers, and gaining fresh adherents who succeed with it according to my own formulæ. It has now become a favourite with many continental amateurs, and I hope and trust that ere long it may be largely used by professional portraitists also, for it is here that its chief utility will be found to lie. I can say, without the slightest exaggeration, that I have many times taken good negatives upon bromide plates with only one-tenth of the exposure which the best common wet plates developed with iron would have required; whilst the same process is equally suitable for taking a direct positive in the camera, from which an enlarged negative can be made at one operation.

Those who are still working on hopefully with emulsions—some with collodion, others with gelatine—have my hearty good wishes for their success; and I will be amongst the first to cry "bravo!" when they have achieved it. Meantime I must beg leave to be a spectator only of their struggles, whilst I venture to work myself in what appears to be a less coquettish direction. The other day I collected together all my old collodio-bromide emulsions, and, having put them into a thick earthen jar with a wide mouth, set fire to them with a match tied to the end of a long pole. To my surprise, instead of an explosion, the stuff burned quite quietly for two or three hours.

I will conclude with a word or two about the serum organifier. Made as our Russian friend recommends it would be simply a solution containing some sugar of milk, saline matter, and free lactic acid, and would merely have the general properties of other acid organifiers. I would suggest to retain the caseine, which is a substance analogous to albumen, by simply adding a little carbonate of soda to skimmed milk, to correct its acidity and prevent it from curdling; then, after pouring this over the film, leaving it to soak in for a minute, and washing it off, to follow up with some gallic acid, which should remain to dry on. Greater sensitiveness would, I think, be gained in this way, as well as greater hardness in the dried film.

Ale has been sometimes recommended as an organifier; but I was much puzzled the other day to know why some Bass's ale of the best quality blackened instantly the steel blade of a knife. Was this due to the tannin which it contained, or to what? Can any of my readers inform me? Ale, I am afraid, might prove to be an organifier of very vague composition. One great merit of fresh egg-albumen is its uniformity and purity. Those who use gelatine in photography should be careful to use the neutral and not the acid sort. I have found that the latter will almost entirely destroy the sensitiveness of a bromide film. Those who use pyrogallic acid in the organifier for dry plates should explain to us why so unstable a substance, and one so ready to absorb oxygen, can be found to answer their purpose, when not washed out of the film as soon as it has been applied. THOMAS SUTTON, B.A.

Sloak Vicarage, near Chester,
April 17, 1874.

* The process referred to will be found fully described in another page in the present number.—EDS.

EXPERIMENTS WITH EMULSION PELLICLE.

To the EDITORS.

GENTLEMEN,—I was glad to see in your last week's number, at page 188, Captain Fox's account of his experiments with my collodion pellicle in the course of which he raises two objections against the process Neither of these can, I think, be considered as serious objections, nor urged against this process in particular.

In the first case, the length of time required to form an emulsion:—I do not think that by the ordinary method an emulsion could be prepared possessing the same degree of rapidity in as short a time. Twenty-four hours is usually the minimum time allowed for the acquisition of full sensitiveness, or even forty-eight hours will be found recommended by some writers. In the case of the pellicle the complete action of the sensitiser is attained in the first stage of its preparation, the final formation of the emulsion depending solely on the solvent powers of the ether and alcohol. That this solvent action upon the sensitive pellicle should be more feeble than upon plain pyroxyline is only what might be anticipated, when it is considered that the pellicle consists of a mixture of pyroxyline, and bromide of silver in the proportion of five grains of the former to eleven or twelve of the latter, approximately, the whole forming a horny mass but slightly affected by either water, ether, or alcohol. The solubilty may be much increased if the pellicle should be required for use at once. After washing thoroughly to remove all soluble matter pour off the last water as closely as possible, and saturate with absolute alcohol. This will in a few minutes "draw" nearly the whole of the water out of the mass, when by draining and repeating the dose it will be in a condition for immediate solution upon merely pressing between clean filter paper, the time required for complete emulsification being reduced to a few minutes.

As regards the difficulty of intensifying, this is by no means a defect inherent in any particular process, but will be found in connection with all the more sensitive emulsions. It is possible to prepare a pellicle which will give the greatest possible density with facility, but it would at the same time be sadly deficient in sensitiveness. I have experimented with different organic substances with a view of surmounting this difficulty, and, though my experiments are not yet complete, I may mention that I have obtained the greatest amount of success with nitro-glucose. Owing to the impossibility of obtaining this substance commercially, and the difficulty of obtaining a stable product in the home manufacture of the article, I have not yet published the result of my experiments, but hope to do so soon; meanwhile I should be glad if Capt. Fox would make a trial in this direction. *Aqua regia*, which is supposed to confer density on *any* emulsion, is absolutely without effect in this one.

I may say that I do not agree with Capt. Fox as to the splitting of the films when a substratum is not employed; I merely tip the edges of my plates, and, so far, have only seen *one* split film. Capt. Fox's canvas percolator is a very good idea, and one which will be found of great use in washing pellicle.—I am, yours, &c., W. B. BOLTON.

Liverpool, April 22, 1874.

LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—More than a week has passed since the Chairman of the meeting of the Society promised to arrange at once for a meeting of the members to pass the new rules, but no such meeting has been notified to us as yet.

As the Presidential chair is vacant, and the Council short-handed by the resignation of Mr. Mayland and others, no time ought, I think, to be lost.—I am, yours, &c.,

A MEMBER OF THE PHOTOGRAPHIC SOCIETY OF LONDON.

London, April 22, 1874.

THE TRANSIT OF VENUS.—At the meeting of the Astronomical Society, held on the 10th instant, Mr. De la Rue gave a verbal description of a piece of apparatus which he had devised for carrying out M. Janssen's method of photographing Venus near to ingress and egress upon the sun's disc. The instrument is intended to be attached to the photo-heliographs, and weighs less than eleven pounds, inclusive of a small driving-clock, which carries a revolving plate of about ten inches in diameter, on which small photographs of Venus and the sun's limb are to be taken. Lord Lindsay also described the form of instrument which he had devised for the same purpose. It appeared to be very similar to that described by Mr. De la Rue, except that it is mounted on a separate pillar from the telescope, in order to avoid tremors.

INDECENT PRINTS.—On Saturday last Mr. C. H. Collette, solicitor to the Society for the Suppression of Vice, attended before Mr. Bridge, at Westminster Police Court, to support a summons against *Henry Hayler*, of Pimlico-road, calling upon him to show why no less than 130,248 obscene photographs and 5,000 slides should not be destroyed, they having been seized by Inspector Harnett and Detectives Chamberlain and Marshall, of the E division.—Giles, the summoning officer, proved that no one had been on the premises for a week, and he had not been able to serve the summons.—Mr. Bridge, after carefully looking into the Act of Parliament, was of opinion that he was in a position to make the order for the destruction of the things seized in the absence of Hayler.—Mr. Collette said the man could appeal against the destruction in seven days if he chose, but there was little chance of his running into the arms of the law. There were six cart-loads of the things. It was one of the grossest cases he had ever had anything to do with.

OBTAINING CLOUD NEGATIVES ON DRY PLATES.—We are favoured by Mr. Reuben Mitchell with some notes on the capabilities of dry plates in their application to the taking of clouds, from which we make the following extract:—"To photograph clouds on wet plates may be simple enough, but the most expert have one great difficulty to contend with—that is, being able to secure the fine effects when they come; for before he can have the plate in the camera all is either gone or changed altogether. This difficulty I have overcome by using dry plates. The camera can be placed in position on a favourable day and a number of slides filled with dry plates placed ready, and, as soon as a pleasing effect appears, not only one, but probably a dozen, plates may be in quick succession exposed—all various. A windy day, if the wind be not too strong, is the best. The changes are both rapid and fine. The negative when developed will delight the operator, and astonish him at the simplicity of these productions. I have so simplified combining clouds with landscapes and other subjects in printing that, with few exceptions, masks are not required, and printing can be done very rapidly."

EXCHANGE COLUMN.

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

Wanted to exchange a good quarter-plate, double achromatic portrait lens for anything useful in photography.—Address, JAMES TUCKER, 10, Oxford-terrace, Hyde Park, London.

For exchange, a full plate portrait lens by C. Burr, with Waterhouse stops. Required for it a 12 × 12 camera with swing back, dark slide, and firm tripod stand. Camera to be by a first-rate maker and in thorough order.—Address, V., The Cedars, Esher, Surrey.

I have an excellent three and a-quarter diameter and eight inches focus Voigtlander portrait lens, No. 5,487, cost £20, which I will exchange for a Ross's No. 2. C.-D.-V. lens; difference of value adjusted to mutual satisfaction.—Address, "FREDERICK'S," at Mr. Wright's, George-street, Aberdeen.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

William Vick, Ipswich.—*Two Portraits of J. R. Bulwer, M.P.*

James Cooper, Darlington.—*Group entitled "The Durham Thirteen."*

W. G. Helsby, Jun., Denbigh.—*The following views:—Bala Church and College; Landing Stage, Bala Lake; Llanyail Church; Calvinistic Chapel, Bala; Llanfor Church; Fron Quarrie (two views); Rhosygwalian Church; Rhosygwalian Cottage; Fachddeiliog Mansion; Hamlet in Valley of Hirnant.*

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

W. M. F. (Nanaimo).—The various articles enumerated can all be sent by post.

F. BOSWELL.—The best developer for moist plates is the alkaline pyrogallic one.

W. J. W.—As the question is expressed we do not quite understand it. In what process is the nickel, or a salt of that metal, used as a substitute for nitrate of silver?

LINDUM.—The desired tone can be obtained by developing with pyrogallic acid restrained by a mixture of acetic and citric acids. The citric acid, if used alone with the pyrogallic, will make the tone of the transparency rather colder than you may wish.

AN ASS.—There is no better method of precipitating silver from the washing water than to add a small quantity of common salt, and, after well stirring, to allow it to subside. If from attenuation the precipitate fall too slowly add a few drops of nitric acid.

W. H. J.—1 and 2. The best proportion will be found to be about twenty-five minims of the strongest liquor ammonia.—3. In the Fothergill process an albumenate of silver is formed in the pores of the collodion film. Its action may be said, therefore, to be partly chemical and partly mechanical.

ROBT. BRIDGART.—Without attempting at present to explain the cause of the phenomenon mentioned, we can give you another instance of a similar, yet more astonishing, kind. A photographer of our acquaintance keeps his supply of glacial acetic acid in Winchester quart bottles, out of which he, for convenience, fills a stoppered pint bottle for use. Now, while both the small and the large bottles are kept in the same cupboard and at the same temperature, the curious fact remains that while the acid in the larger bottle remains fluid, that in the smaller one is usually congealed into a crystalline mass, requiring the application of heat whenever a portion is wanted for use.

PERPLEXITY.—The appearance of the prints indicate that the paste is in fault. In No. 1 the fading appears in the form of streaks, as if connected with the paste-brush. We have shown the prints to several friends, who all agree with us as to this being the probable cause of the fading.

AULD REEKIE.—Make a solution of nitrate of uranium of from thirty to forty grains per ounce of water, and then add twenty grains of nitrate of silver. With this bath sensitise your paper. We are well acquainted with the view described, and quite agree with you that for rugged grandeur there is nothing in the vicinity of our metropolis which can be compared with it; but——it cannot be photographed!—we mean with ordinary appliances. The pantascopic camera is the only instrument by which it can be photographed, for the view subtends an angle of about 120°. Thanks for enclosure.

T. W. H.—This correspondent says:—"Will you allow me to ask Mr. T. Forrest, through the medium of your Journal, if the formulæ for making collodion on page 90 of this year's ALMANAC (substituting one hundred grains of pyroxyline for one drachm) are correct? I have been trying, and I find the iodising solution in formula No. 2 is colourless; should this be so? No. 1 appears to be the colour of the usual iodiser. I trust Mr. Forrest will not consider me troublesome; but, being only an amateur, perhaps this will be taken as an excuse if it should happen that I am asking an unnecessary question."

E. H. T.—1. The best remedy for the blinding effects of the etherial vapours would evidently be to collodionise the plate outside the tent, then immerse it in the bath through the flap door, afterwards covering the bath.—2. The cause of the uneven drying of the film is to be found in the repellent and horny character of the collodion. If the collodion can bear it a cure may sometimes be effected by the addition of two or three drops of water. Age also usually deprives it of this tendency; but, in the meantime, you should obtain another sample of collodion.—3. An article on the transferrence of of varnished collodion films appeared in this Journal a few weeks ago. You will find there all the information required.—4. Diluted golden syrup is preferred by many to either.

A. J. CORRIE.—In the first place, the substratum of albumen is so exceedingly attenuated that, even if it were to be dissolved in the silver bath, the amount of harm could not be *very* great; but, secondly, the action of the silver upon the albumen would be to coagulate it, or render it insoluble; while, thirdly, this coagulation would be effected by the alcohol in the collodion, leaving nothing for the silver bath to do in this direction. The solution of shellac proposed as a substratum would not answer, because as alcohol is the solvent proposed the substratum formed by this gum would be instantly dissolved by the collodion. The fundamental principle in a substratum is that it be insoluble in either alcohol or ether. A solution of india-rubber in benzole is much used, and is free from any grave objection.

PERPLEXED.—1. The lens is evidently not at fault.—2. Place yourself in the sitter's chair, cast an eye round and observe the amount of sky visible from that point, and institute a comparison between the light obtained from this source and that by which the sitter was illuminated when placed outside. In this way you will form a very good idea whether it is the *quantity* or *quality* of the light inside which is at fault.—3. A white screen, judiciously placed, will, undoubtedly, increase the amount of light upon the sitter.—4. If by lowering the roof you can obtain a larger angle of light, or, in other words, admit more light, then do so. Small studios are generally the most rapid in action.—5. By inserting ground glass in the side of the studio, so as to shut out the view of the brick wall, the illumination will be increased.—6. At this time of the year, and in a good glass room, negatives should be obtained in from five to ten seconds, with such a lens as that you have described. —7. Yes.

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

LONDON GAZETTE, *April* 21, 1874.

PARTNERSHIP DISSOLVED.

BYRON and CLAYTON, Leicester, photographic artists.

METEOROLOGICAL REPORT,

For the Week ending April 22, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
16	29·98	NW	48	50	61	45	Dull
17	30·03	WNW	46	50	59	46	Fine
18	30·0	W	51	53	65	49	Dull
20	30·14	WNW	49	53	69	47	Dull
21	30·01	ESE	52	57	78	48	Fine
22	30·13	NNE	51	57	—	51	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 730. Vol. XXI.—MAY 1, 1874.

THE RESULTS OF SOME EXPERIMENTS WITH EMULSIONS.

The recurrence of "May Day," with the train of fine weather which we hope it will bring, must induce a host of amateur photographers to look up their cameras and lenses and to prepare for the work of the season. With many we know the object is not so much the production of good pictures—although these are welcome enough when they come—as the pleasure derived from experimental practice. Such members of the fraternity will, of course, eagerly take up every suggested new process or modification of an old one, and doubtless do good service to the cause by their zeal, energy, and experience. The large class, however, whose aim is the production of good negatives, know that such results can best be attained by the adoption of some one process, and clinging to it more or less constantly throughout the season. Now, while wet collodion will, for various reasons, always attract a certain number of workers, the convenience and ease with which dry plates can be managed must ensure for them a very large measure of public favour. The question, then, which each must settle for himself is which of all the various processes will suit his requirements best.

We have frequently said before, and we again repeat it, that we believe, and have by our own experiments abundantly proved, that good negatives may be secured by almost any of the processes which have been introduced; but, of course, we do not say that they are all equally good. Each may have some advantage peculiarly its own, and the best dry process will naturally be the one which in itself combines the greatest number of those advantages.

For our present purpose we may assume that, practically, the dry processes are divided into two classes—those by emulsion and those by the bath; and, while much may be said in favour of both, we believe that, *cæteris paribus*, the emulsion process, from the facility with which the plates can be prepared and from other causes, will generally secure a preference. Under this impression, and in consequence of the exceedingly varied testimony of which our columns during the past two years have been the medium, we, in October last, commenced a series of experiments with a view to test the keeping qualities of both emulsions and emulsion plates, and also the relative advantages of emulsions prepared in various ways.

Having obtained a suitable sample of pyroxyline—which is really one of the most important and difficult things in connection with emulsion work—we made a normal collodion containing six grains of the cotton, six grains of anhydrous cadmium bromide, and three grains of ammonium bromide in each ounce of a mixture of six parts of ether and two parts of alcohol. Two ounces of this normal collodion were placed in each of four three-ounce bottles, marked respectively 1, 2, 3, 4, and the following quantities of silver nitrate dissolved by heat in two drachms of alcohol were added:—To No. 1 twelve grains; to No. 2 twelve grains and thirty grains of uranium nitrate; to No. 3 eighteen grains of silver and thirty grains of uranium nitrate; and to No. 4 sixteen grains of silver nitrate and two drops of nitro-hydrochloric acid. The emulsions thus made were allowed to stand for five hours, and then two plates were prepared from each—one for immediate exposure, the other intended to lie for six months. In like manner two sets of plates were prepared each month, one always being exposed, and the results noted; and within the last few days the whole six sets which had been laid aside have also been exposed, and we now proceed to record, for the benefit of our readers, the story which the notes of these experiments tell.

Of the five hours' old emulsions, Nos. 1, 2, and 4 gave thin, opalescent films, while No. 3 was more creamy. Of the four exposed and developed at once, Nos. 1 and 2 were about equal in sensitiveness, and density was readily obtained. No. 3 required only a fourth of the exposure given to Nos. 1 and 2, and yielded a printable negative. No. 4 was only a little less sensitive, but nothing beyond a thin, greenish deposit could be got, which failed, even with pyro. and silver, to attain to printing density.

Of the set prepared in November, when the emulsions were one month old, Nos. 1, 2, and 4 were much increased in density, while No. 3 was almost too thick to admit of being easily poured; when, however, it was thinned with ether, it behaved very much like the rest. On exposure and development Nos. 1 and 2 were about equal in sensitiveness, and required at least one-fourth less exposure than when fresh; density was easily obtained, the high lights being quite opaque, and the gradation quite satisfactory. No. 3 had also increased in sensitiveness, and was more easily developed to full printing density. No. 4 had also improved, but still required an application of pyro. and silver.

In December the two months' old emulsions were very similar to those of the previous month, except that they had all got thicker—partially, no doubt, from loss of ether from previous plate-coating, but also from age, as the increase was greater than could be accounted for by evaporation alone.

In January, February, and March, when the emulsions had been made three, four, and five months respectively, they remained very much in the same state, except that No. 2 began to give undoubtedly harder negatives, the contrast between the lights and shadows was greater than in the case of the other negatives, while Nos. 3 and 4 had lost, to a certain extent, their extra sensitiveness, the relation between them and Nos. 1 and 2 being now about two to one. The increase of thickness of all the emulsions by March was such as to prevent an even film being formed; but on the addition of twenty per cent. of ether to each they again gave beautiful films.

Although the plates were coated with a substratum of albumen, those prepared during the earlier months had a tendency to slip from the glass during the washing after fixing; but that fault altogether disappeared in the batches of February and March.

The plates laid aside month after month were all exposed during one forenoon on a suitable test object—an avenue of trees and evergreens, pretty well lighted, but with sunlight on one side. The lens was one of about six inches focus, and the stop $\frac{f}{30}$. An exposure of two minutes was given to each plate, and they were all developed with the strong alkaline solution introduced last year by Colonel Stuart Wortley. Nos. 1 and 2 were throughout under-exposed, the early plates being very little different from those made later. The early batches of Nos. 3 and 4 were considerably over-exposed; but those from December onwards gave excellent results, No. 4 being, on the whole, cleaner and crisper than No. 3. In no case was either No. 3 or No. 4 quite equal in delicacy, and in that indescribable quality which is sometimes called "bloom," to some of the best of Nos. 1 and 2 of the previously-exposed lots.

We cannot afford space for a minute analysis of the whole experiments, but shall sum up our opinion of the results in a few words. Where extreme sensitiveness is not required, an emulsion such as No. 1, which contains a trace of free bromide, is probably the most facile to work. It is easily developed to sufficient density, and gives negatives which leave nothing to be desired. The addition of uranium to such an emulsion is not only unnecessary, but after a time becomes positively injurious, as it tends to give hardness and offensive contrast to the negative. We also believe that, contrary to the generally-received opinion, such an emulsion will keep in good working order for at least several months, and that plates prepared with it will keep for any length of time. Where great sensitiveness is required a large excess of silver may safely be employed; but it must be restrained by either uranium or nitro-hydrochloric acid. Between these two there is not much to choose; if pressed into a corner, probably we should prefer the *aqua regia*, as we think that while it is in all respects equal to the uranium, we believe also that it has an action on the pyroxyline which lessens the tendency to slip from the plate.

To such of our readers, then, as intend "going in" for the emulsion process, we can with confidence recommend either Nos. 1, 3, or 4; and feel quite certain that if they only persevere till the preliminary difficulties are overcome, they cannot fail to be successful.

PROBABLE DRAWBACKS TO THE GELATINO-BROMIDE PROCESS.

If gelatino-bromide plates are ever to secure general favour similar to collodio-bromide plates, it becomes important to look fairly in the face a danger to which they are liable, to an extent and in a degree quite unknown, in connection with collodion.

A few months ago we prepared some gelatino-bromide plates which were really excellent when used within a few days after preparation. We placed them in a dark closet which, while it could not be said to be very dry, was by no means entitled to be considered damp. On trying one of the plates a few days since we were much disappointed with the result. Microscopic examination of the sole remaining plate led us to imagine that dampness, or at anyrate some sudden condensation of the moisture in the atmosphere, had set up a process of decay in the *materiél* of the film.

If a film of gelatine absorb moisture and remain moist for any length of time, incipient putrefaction may supervene, which will be fatal to the homogeneity of any pellicle intended for photographic purposes. One plate which we have had under treatment for some weeks, so as to see the final result, has become mouldy.

Now, while it is not probable that gelatine plates will ever be subjected to such conditions as to cause the organic matter to putrefy, still, as it is quite possible that they may eventually arrive at this state, it is of importance to guard against such a fatal result. Mould and putrefaction are the certain concomitants of moisture in connection with gelatine. Care, we all know, will prevent the exposure of a plate to such influences; but many photographers may not be aware of the meteorological fact that the atmosphere, when warm, retains in perfect solution a very large quantity of water, which it will at once deposit as "moisture," or dew, upon a decrease in the temperature. At the present season, and with such weather as we are now enjoying, one has only to step into his garden and inspect the various plants at a moderately early hour in the morning to become thoroughly well satisfied on this point. What takes place on such a noticeable scale out of doors also takes place in a less degree inside of even a dark room or closet; hence it becomes of importance to adopt such preventive measures as shall secure the gelatine film against the adverse influences of moisture.

Gelatine, when prepared as usually directed, is simply a vehicle for the retention of the bromide of silver; but it still remains gelatine, and subject to all the changes incident to this protein compound. What is required is that by some preparation or admixture it shall be so changed in its character as to be no longer liable to decay or decomposition. Tannin has the effect of converting gelatine into something akin to vellum, which we know to be a substance unassailable by the action of time. Carbolic acid and other antiseptics we know preserve gelatine; the question, therefore, arises—Cannot conserving agents of this kind be utilised in connection with the preparation of gelatino-bromide plates?

Carbolic acid, it is possible, might exercise an adverse influence upon the sensitiveness of the plate and the quality of the image; but tannin or salicine would scarcely be likely to have such an effect. The final wash of gallic acid, which was first proposed by Major Russell as a means for causing the permanence of collodio-albumen plates—an effect it has certainly had, and for which photographers are grateful to him—might be useful when applied to gelatine plates. What is unfortunate in connection with many of these washes when applied to gelatine is their physical effect upon the film, more especially when applied as an aqueous solution; but other solvents, or other modes of applying these or similar preservatives, may eventually be discovered by which their antiseptic properties may be utilised without any injurious result.

A READY METHOD OF ESTIMATING THE CHEMICAL FORCE OF THE SUN'S RAYS.

It will be remembered that, in our last article upon this subject, we proposed to estimate the amount of decomposition effected by light upon the solution of ammonio-oxalate of iron by a volumetric solution of the red chromate of potassium. As the ferric oxalate is decomposed into ferrous oxalate and carbonic acid it is really immaterial whether we estimate the carbonic acid evolved or the iron salt reduced. The latter may be done with great facility by two or three methods. We will especially mention Penny's method—not because it has been proved to be the best, but because it is the only one that we have had time to apply.

Penny's method is based upon the fact that a ferrous salt, when acidulated, is oxidised to its highest stage by a solution of chromate of potassium; and, therefore, if a volumetric solution of the latter salt be used, or a solution of which we know the exact strength, we can also determine the exact amount of ferrous salt that had been produced by actinic reduction.

The permanganate of potassium process might be used also for this purpose; but, as we have not experimentally used it, we merely throw out the remark as a hint for other investigators. This reaction is very delicate; but in this method the oxalic acid of the ammonio-ferric oxalate would be also oxidised by the volumetric solution of permanganate of potassium. We should thus be compelled to rely upon the difference which would be produced by the ferrous salt present. However, the following may be adopted as the *modus operandi*:—In the beaker has been placed a solution of ammonio-ferric oxalate of a known strength—say ten grains to 1000 of pure water. This solution should be kept in a non-actinic bottle, and the small amount of ferrous salt it contains carefully noted; for it always contains a trace, but, if properly prepared, only a trace. A considerable quantity of this solution is made at once, so that one determination will suffice, and a correction can be made which will do for all the other experiments. The salt is very soluble, and therefore the solution can be made in the cold.

The volumetric solution of red chromate of potassium, or bichromate of potassium, as it is sometimes called, is in the *Pharmacopœia*. It is made by dissolving 147½ grains of the salt in 10,000 grains of water. 1000 grain measures of this solution contain fourteen and three-fourth grains of the chromate, or one-twentieth of an equivalent in grains. It is, therefore, capable of converting 16$\frac{8}{10}$ths grains of iron from the state of protosalt to that of persalt. Of course it will only act in the presence of acid, for it is really the chromic anhydride (Cr_2O_6) in the chromate of potassium ($K_2Cr_2O_7$) that acts. The following equation represents the reaction:—

$$\underset{\text{6 molecules of ferrous oxide.}}{6\,(FeO)} + \underset{\text{Chromic anhydride.}}{Cr_2O_6} = \underset{\text{Chromic oxide.}}{Cr_2O_3} + \underset{\text{3 molecules of ferric oxide.}}{3\,(Fe_2O_3)}.$$

This volumetric solution of chromic salt is used in a burette or vessel divided into 100 parts, and it is only necessary to carefully fill the burette at the commencement of each experiment, and to add it, degree by degree, until the whole of the ferrous salt reduced by the sun's rays is again oxidised up to its highest terms, and then to observe how much has been added to effect this. The number of degrees used is the measure of the ferrous salt.

Now we have described the volumetric solution of the *British Pharmacopœia*, but for this special purpose we think it will be found more convenient to dilute this solution with its own volume of water, it having been found too strong for the special purpose we have in hand; therefore, as the original solution equalled $16\frac{8}{10}$ths grains, a buretteful of the diluted solution will convert $8\frac{4}{10}$ths of protosalt of iron into a persalt, and as the burette is generally divided into a hundred degrees, each degree of this will equal one-hundreth of that amount. Its oxidising power is equal to the following, or represents force capable of doing the following work:—

1,000 grains, or buretteful, divided in 100° = 8·4 grains of iron.
" " " = 2·4 grains of oxygen.
" " " = 0·9 grains of carbon.

From these figures the potential power of the sun's rays may be calculated.

There is one minute detail which it is necessary to mention. How is the point determined at which the whole of the reduced iron salt is re-oxidised? We have a salt which is particularly suited to the determination of this point. Ferricyanide of potassium, or *red* prussiate of potash, as it is commonly called, possesses the property of striking an intense blue colouration with ferrous salt, but none with ferric salt; a little of this salt in solution, therefore, is sprinkled over the surface of a white dinner plate, and, after the addition of each degree of the volumetric solution of the chromate, a drop is taken on the end of a rod from the beaker containing the solution we are trying, and brought in contact with one of the spots of ferricyanide upon the plate. As long as there is the slightest trace of a ferrous salt left unoxidised it strikes a blue colouration, but on the completion of the operation the reaction disappears.

To summarise the operation of which we have given the details above we will append the following short sketch:—There are 500 to 1000 grains of the solution of ammonio-ferric oxalate placed in a beaker, and this beaker, after being inserted in the blackened cardboard case, is so placed that the light may fall directly through the standard orifice. If it be determined to give a long exposure, or if the light be very strong, a relatively larger amount of the iron salt must be used; for it is self-evident that there must be a larger amount of iron solution present than could possibly be reduced by the actinic influence in a given time, whatever time that may be. The presence of an excess of the persalt of iron may always be ensured by testing a drop of the solution with ferrocyanide of potassium, which strikes a blue colouration with the last-named salt, just in the same manner as ferricyanide strikes a blue colouration with the proto or ferrous salts. It must also be remembered that the trace of protosalt always present in the solution of ammonio-ferric oxalate must be determined by the volumetric solution of chromate. This first determination or correction can be marked upon the stock vessel and used as a correction for all experiments; but in every case the ferrous salt present is to be deducted from the result. After an exposure of a given time the beaker is taken out of the case and acidulated with half-a-drachm of diluted hydrochloric acid, and the volumetric solution is added degree by degree, noting the state of oxidation by withdrawing a drop of liquid occasionally with the aid of the stirrer as detailed, and bringing it in contact with the ferricyanide on the plate. The action is well marked and easily worked when once the manipulator understands the process. At ordinary temperatures the oxalic acid does not seem to react upon the chromic anhydride; therefore this method of manipulation would probably prove more simple than the permanganate of potassium process.

We do not give the foregoing method as one incapable of improvement—because the experiments were too meagre to warrant us in a statement—but rather as the basis upon which a very good one may be worked out by attention to details.

ALTHOUGH Mr. M. Carey Lea has, in a communication which will be found under the head of "Correspondence," stated plainly enough that carelessness or mismanagement in the preparation of the detergent recommended by him might result in a very dangerous explosion, we still consider it necessary to add a few words to Mr. Lea's timely caution. Iodide of nitrogen is *very* easily prepared—scarcely anything can be more so. A few crystals of iodine are dissolved in ammonia, and there it is! But what to do with it, or how to handle it when obtained, is the question. The difference between a combination of ammonia and iodine that is quite safe and one that possesses fearfully-explosive powers is exceedingly slight, although sufficiently well marked to prevent a really careful experimentalist from jeopardising his safety. Nothing, as we have said, can be simpler than the making of a solution of iodine in ammonia. Place a small quantity—fifty or sixty grains, for example—of iodine in an evaporating dish, hold it over a spirit lamp for a few seconds until it is warmed and vapours begin to rise, and then add a small quantity of liquor ammonia. Upon the quantity added everything depends; as the experimentalist values his life we urge upon him attention to the following observations:—If the preparation is to be used in the formation of the ammonio-iodides of metals, see that there be always an excess of iodine. No matter what quantity is prepared, no harm whatever will occur so long as the iodine is in excess. Gold, silver, cobalt, and other metals dissolve instantly in this solution, and some of them form exceedingly beautiful arborescent crystals; for when heat is applied to such a crystalline body the iodine is driven away, and the metal is seen in a brilliant metallic state. But with an excess of ammonia, ascertained by all the iodine being dissolved, the greatest care must be taken; for with this excess a dark powder—the teriodide of nitrogen—is thrown down, a portion of which the size of a mustard-seed will, when dry, explode by the touch of a feather, and with a force capable of shattering objects in its vicinity. It will explode even while wet, and sometimes without being touched. The chloride and iodide of nitrogen stand, in respect of strength, at the head of the list of all the fulminating compounds yet known. Hence we again enjoin care in preparing or in working with them.

CHEMICAL COMPOSITION OF THE DEVELOPED PICTURE ON SILVER BROMIDE FILMS.

IN THE BRITISH JOURNAL OF PHOTOGRAPHY for 1865 I published the results of a large number of experiments made in the endeavour to fix the nature of development. These investigations led to the conclusion that in the case of an ordinary iodo-bromide wet plate, although a faint image could be brought out after long and careful washing by a pyrogallic developer in the entire absence of silver nitrate,* yet in actual practice and under ordinary conditions the developed image is made up out of silver, derived, not from the silver compounds of the film, but from the developer† mixing with the bath solution with which the film is impregnated—so completely so that mercurious nitrate may be substituted in the development for silver nitrate, and an image may be built up of mercury instead of silver.‡

On the other hand, in the case of a silver bromide film the action was found to be very different. The bromide film is modified by light through and through, and the image is formed entirely at its expense (THE BRITISH JOURNAL OF PHOTOGRAPHY, p. 1865, 351). This opinion was expressed both by Major Russell and myself; and in an article on the subject, at page 376, same volume, Major Russell writes that the communication just quoted had led him to test the question by dissolving out the darkened portion of the film. This experiment resulted in the discovery of the now well-known method of converting a bromide negative into a positive, and established the fact that

* THE BRITISH JOURNAL OF PHOTOGRAPHY, 1865, p. 424.
† *Ibid*, p. 351.
‡ *Ibid*, p. 376. See also p. 232.

the bromide picture was formed at the expense of the film, since its removal left the film carved out, as it were, into a reverse picture—a sort of cast of the original image.

These views have since passed into general acceptance, but an entire uncertainty has remained as to the chemical nature of the developed bromide picture. In the communication just referred to Major Russell considered that he had proved it to consist of metallic silver. Last year Captain Abney expressed the opinion that it consisted of silver oxide. I believe that neither of these opinions is correct.

Some years ago, whilst studying the action of light on silver iodide, I found that the black substance which is produced when silver iodide is exposed to light in contact with a solution of silver nitrate was resolved, when treated with nitric acid, into metallic silver or silver oxide (which dissolved) and ordinary silver iodide (which remained). A portion of this black substance, when placed in a beaker with nitric acid, became yellow, of the shade of ordinary silver iodide, and the nitric acid was found to have silver in solution. It was proved in this way that the black substance consisted either of silver subiodide or oxyiodide—probably the former.

It occurred to me, therefore, that the same test could be applied to a bromide film, and I found that the same result followed. A bromide picture, from which every trace of ordinary monobromide had been removed by sodium hyposulphite, was treated with nitric acid, which dissolved out silver, leaving behind a pale-yellowish film of ordinary silver bromide. This silver bromide was not there before, or it would have been removed by the hyposulphite; therefore it was formed by the action of the nitric acid out of the black substance of which the picture was composed, and, therefore, this black substance was either silver sub-bromide or silver oxybromide—I think probably the former. M. Carey Lea.

A NEW STYLE OF PHOTOGRAPHIC PORTRAIT, VIZ., A COLOURED CARBON ENAMEL.

Coloured photo-vitrified enamels command at this moment the highest price of any style of photographic portrait, because they are not only the most permanent, but also the most beautiful, of the joint products of the pencil and the camera. M. Lafon de Camarsac charges, if I remember right, about 100 francs (£4) for a coloured enamel of the smallest size, and 1,000 francs (£40) for one of the largest size, which is an oval not exceeding about six inches in its longest diameter.

The question then arises whether any cheap substitute could be found for this style of portrait which should be equally beautiful and equally permanent, and done by a process which should not require years of painful experimenting to perfect, or a special mode of colouring, a knowledge of which is extremely difficult to acquire.

This substitute may, I think, be found in the mode of printing and colouring carbon proofs upon glass, which I will now briefly describe as the result of many successful practical experiments which I have myself made.

The mode of printing upon glass by the carbon process is admirably described in the last edition of the *Autotype Manual*; and no one who obtains the pigmented tissue from the Autotype Company and follows the instructions contained in that work will find any difficulty in succeeding with the process, for it is, in truth, the simplest of all known methods of printing, and at the same time the most quickly performed. The following is a brief sketch of it:—

Excite the pigmented tissue by immersing it for half-a-minute in a strong solution of bichromate of potass. Dry it in the dark. Expose it under the negative for less than half the time which sensitive albumenised paper would require. Put the exposed tissue into a dish of cold water, with a glass plate under it, and bring out the plate with the pigmented side of the tissue adhering to it. Press the latter into close contact with a squeegee, and leave it adhering for about five minutes. Now put the glass plate, with the tissue sticking to it, into hot water. The paper will come off, leaving the carbon print upon the glass, and a little more treatment with hot water will perfectly develope it. The print is now finished. The whole operation of exposing and developing need not occupy more than a quarter of an hour, even without sunshine. There is no fixing, no toning, no fading, no trimming, no mounting, no rolling. Nothing can exceed the simplicity of the process or the beauty of the result, which, as I hope to prove presently, is as permanent as a vitrified enamel.

Now comes the operation of colouring the print. This is to be done with opaque oil colours, diluted to the proper consistency for working with picture varnish, and applied to the print itself, which, when finished, is to be viewed from the front through the glass. Observe that the colour does not hide the details of the photograph, because the colour is seen *behind* them. In a coloured vitro-enamel this is not the case, since the colours are applied to the front of the photograph. The coloured carbon enamel has, therefore, greatly the advantage, since it is coloured on a correct principle, while the enamel is not.

A word or two now about the comparative permanency of these two results. In a coloured vitrified enamel the image, which is composed of metallic oxides, is enclosed within an extremely thin film of glaze or glass. This can be very easily scratched, and the picture destroyed; but in a coloured carbon enamel the image, which is composed of carbon and metallic pigments, is cemented by oil and varnish to the back of a glass plate, and if the front of this be scratched it can be fresh ground and polished, so that the picture is *not* necessarily destroyed. In both cases the back of the picture can be equally well protected by a plate of metal or glass permanently cemented to it. On the whole the coloured carbon enamel seems to me to have the greater chance of permanency and to run the less risk of damage by accident. It must be remembered that the fire to which the vitrified enamel is subjected is of a very mild character, and the heat only just sufficient to fuse the delicate film of glass. The picture would be quickly destroyed if held in the flame of a spirit-lamp. In both cases the internal causes of fading may be practically disregarded, whilst the liability to irreparable destruction by accident would be greater in the case of the vitrified enamel.

With respect to the novelty of the process now described, that lies wholly in the method of colouring, which does not, so far as I can learn, seem to have been employed until now. The only mode of backing or colouring a carbon print upon glass which is described in the *Autotype Manual* is conveyed in the following extract from the work, in which the author says, at page 54:—

"The best way of backing the picture is to coat it with a thin layer of zinc white ground in oil, so as to give a perfectly opaque film. When this is thoroughly dried the film may be mounted in a case or frame, to protect the print from rough usage. Or plaster may be poured upon the back of the print, thus producing a sort of tile, embodying a pure carbon, and therefore indestructible, picture within its substance, but with an adherent glass face. The picture may be worked upon behind to any extent before the white backing is applied. If the high lights be nicely touched with Chinese white a grey or tinted backing may be applied, giving a most beautiful picture in the *deux crayons* style. Or the picture may be tinted with oil or with powder colour before being backed; but this requires a special pigment paper."

I need not say that *tinting* with oil colour before backing the picture with white is a vastly different thing from painting it with opaque oil colour without any backing at all—a method of colouring carbon prints upon glass which, I think, I may now claim to have been the first to publish. Thomas Sutton, B.A.

ON ENAMELLING AND THE USE OF DUST DEVELOPMENT IN PHOTOGRAPHY.

Considerable attention has lately been directed on the continent, and more particularly in Austria and Germany, to the mode of producing duplicates of negatives practised with success by Herr Obernetter, of Munich, and known in this country as the "dusting-on" process. We lately gave a brief note of Herr Jacobi's on the subject; but since then much fuller information has been published by the other gentleman named, and the subject is one of so much interest to photographers that we propose to lay before them the substance of his remarks.

In his first paper Herr Obernetter sets out by saying that, so far as he is aware, a Mr. J. Wyard, of London, was the first, about the year 1860, to use the process for coloured enamels on glass and English porcelain. Joubert, Lafon de Camarsac, and Poitevin worked in the same manner, and in the London Exhibition of 1862 the second-named of these gentlemen had a cup and several brooches enamelled with burnt-in photographs. Herr Obernetter was induced then to experiment with a view to finding whether the application of powder in this way might not be extended, and since 1862 he has used the process, aiming therewith at many results.

The latest of these—the multiplication of negatives by this process—induced him to bring it more fully under the notice of his brethren, in the hope that they will reward him by extending still further the field in which it may be useful. In the earlier days of enamelling he found no small difficulty in getting at any details of the processes in use. They were known only to persons here and there; but in the course of a year he had elaborated a sure system for himself. Now a great number of plans are found published in all photographic journals and in every manual. Closer examination reveals that there is little difference amongst these plans; but it is noticeable that they all show the same kinds of imperfections, even in the latest published methods, but which are impossible by the certain method employed by him.

The plan hitherto generally pursued was to mix a bichromate salt with some organic body—such as albumen, gelatine, gum dextrine, gelatine, sugar, &c.—coat a glass, or paper, or porcelain with it, print it under a positive, so that the film is made partially insoluble, and then dust over it the enamel colour, which adheres only where the light has not been. Whatever the after-treatment of such an image, it is always necessary to wash out the superfluous chromates by means of an acid, and the employment of this acid is a great source of failure. The results are not good, the tone is bad, and when burnt-in on porcelain the picture comes out dull. In his earlier experiments Herr Obernetter found that the origin of the flat, miscoloured pictures which he got lay in a chemical change in the colours originally used. In order to find out the action of the various agents used in the formation of the image on these enamel colours he took them in turns and burnt in the pictures so taken on porcelain with these results.

Water and the organic bodies—such as gum, albumen, &c.—are without any influence; the colours used therewith and washed therewith come out of the fire without change. Chromate salts destroy the lead fusion of the colour, and give chromic oxide of lead. If the colours are used with an excess of a solution of bichromate salt it will be found that all fusion will be stopped, and that instead the oxide will be there. Such colours give, when burnt, no gloss whatever. By using a single chromate which is neutral or alkaline the result may be better, and, if a good gloss can be so obtained, the colours will be found unchanged. But with acid of any kind fusion is stopped, the metallic oxides of the individual colours then become partially altered and dissolved, and the colours themselves lose their hue and brilliance; for they are, in fact, enamel colours no longer, but only a mixture of rather soluble oxides, such as oxide of copper or cobalt, or as silicates. Yet in nearly all the methods hitherto published it is recommended that the powdery image should be washed in weak acid or plunged in it, so as to get rid of the excess of bichromate, although it has been long known that this is the chief cause of bad tones and imperfect fusion.

The means of meeting the difficulty lies at hand—we have only to take an alkali instead of an acid. This will neutralise the action of the bichromate, will act as a solvent of the chromic oxide of lead, and will lay hold of the other oxides in fusion. Enamel colours suffer no alteration from treatment with a weak solution of potash or soda. This method Herr Obernetter has used for ten years, and he ascribes to it the uniform success which has attended his operations.

All published methods are alike usable if the word "acid" be eliminated from the formulæ, and he is convinced that all those firms who showed beautiful results at the last exhibition did so only because they used alkalies instead of acids for washing out the surplus chromates; and, however they may have come to adopt this system—whether from any influence direct or indirect of his or not—Herr Obernetter is resolved that he shall be the first to make the thing known for the general good.

It is not necessary, he thinks, to distinguish the various sensitive films used as to their sensitiveness, for all of them are pretty much alike. Gum dextrine, albumen, or gelatine, with more or less sugar, and with from eight to ten per cent. of bichromate of ammonia, mixed together, and water added as may be necessary, gives about equal results. Herr Obernetter uses for porcelain the simplest possible formula, namely, gum and grape sugar, with glycerine added to regulate the solubility of the film, according to the state of the atmosphere—the most troublesome adjunct of all, and one that only use and experience can enable one to combat.

Many people torment themselves on account of this with making, pouring, and dusting the solution and film in the dark; but this is not necessary. A solution made in the light does not lose its good qualities; neither does the film, if only exposed so long as is necessary to take the plate out or put it into the copying-frame. All Herr Obernetter's porcelain enamels are done in the ordinary daylight in that fashion.

Whoever once works with this method will not be slow to observe that it is capable of various applications. At the same time that he was making his porcelain enamels beautiful stereoscopic transparencies were being made by the process in Paris, and these he had actually reprinted on to cups, goblets, &c., as burnt-in photographs. They were unvarnished, easily damaged, and done on very thin glass. Cut in halves, they were printed from thus:—A solution was made consisting of—

Gelatine	15	grains.
Gum	30	„
Sugar	120	„
Bichromate of amm.	60	„
Water	5¾	ounces.

A plate was coated with this solution, dried, and exposed under the half stereoscopic positive. It was then powdered over with finely-divided silver, obtainable by adding sulphate of iron to a weak solution of nitrate of silver. The weaker the silver solution the finer the particles precipitated. To precipitate, wash, and dry this substance is a long and not very pleasant labour, and it is costly; hence Herr Obernetter sought long to find some substance that would do better than it. He tried oxide of iron, earth colours, &c., and at last lighted on graphite as a substance reasonable in price and adapted for all purposes. If the image were too dense on the plate it was washed over once with a mixture of nitric acid, spirits, and water in equal parts, thus removing the sugar and chromate, and then varnished. Six or more duplicates of the original were thus taken, and then it was possible to print several pictures on porcelain at a time. These positives were all reversed, and gave, therefore, images the right way on the porcelain; and it was just as easy to reproduce negatives in the same way, only he did not require to do so in his business, and others did not want them.

Yet another interesting experiment is the following:—Coat a copper, zinc, or glass plate with a thick solution made as follows:—

Gelatine	160	grains.
Glycerine	30	„
Bichromate of amm.	60	„
Water	1¾	ounce.

Let it dry, and expose under a reversed negative. After exposure dust it over with the finest zinc powder obtainable. If the plate be held flat one can easily see whether and when the image appears a complete positive in reflected light. But if a deeper, mere typographic, plate is wanted the dusting should be continued till this is no longer possible. With glass it is easy to see when the plate is dense by transmitted light; but with copper one must use the graining of the deep shadows as a guide. When the plate is properly developed in this fashion it should be washed with water until the yellow of the excess bichromate is all removed, and then set up to dry spontaneously. If the chromate be not all washed out it may happen that exposure to light for a long time or to a heat of about 150° will render the whole of the film insoluble. Should it become so from this or any other cause it may be treated with a diluted solution of spirit of salt. The zinc is by this means dissolved off, and the hydrogen formed in the process reduces the insoluble gelatine when coming in contact therewith *in statu nascenti* to its previous soluble condition. By damping with water films of this sort may be printed from as from a lithographic stone; and if a relief be wanted the plate has merely to be washed with warm water, when the surface rises under the zinc in proportion to the density of its deposit, or, in other words, to the solubility of the film. The method is only useful for line engraving reproduction, however, owing to absence of half-tones.

Herr Obernetter thinks that plates for typographic printing might be obtained thus. The first pictures he did in a press were done in this way, and even now, when he has a large edition to get rapidly ready—especially if it be of sharp outlines or maps—he has still recourse to it. There is a great drawback, however, to working with the zinc, on account of its unhealthiness. Half-a-day's work with it will produce on the morrow a metallic taste in the mouth, loss of appetite and sickness; and, though this can be partially guarded against by breathing through a respirator, it cannot be wholly overcome, and it is, besides, needful often to breathe upon the plate, in order to complete the picture. So that one can only do two or three plates in a day without injury.

Further notes upon this interesting subject, dealing with the use of iron and other metallic oxides, will be given at a future time.

A. J. W.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I quite admit what you term the "importance and responsibility" of the office of Keeper of the Museum of Patents to which Colonel Stuart Wortley has been appointed. That Museum is at present simply a disgrace to the nation; even the well-worn expression "cribb'd, cabin'd, and confin'd" will not apply to it. The only phrase to apply to the establishment that I can at present think of by which strict justice may be rendered is the amorphous one—"chaotic." If Colonel Wortley really desire to "make his mark" in connection with what ought to be a useful and educational institution of the highest character, let him move heaven and earth *and* the Government—with whom he is not, or should not be, devoid of influence—to obtain a new site for the Museum. The Patent Museum of Great Britain *ought* to be something very different from what it has been hitherto.

In expressing my gratification at seeing Mr. M. Carey Lea once more amongst your regular contributors I believe I speak the sentiments of every reader of this Journal. I trust that during his recent sojourn in Europe he has received such an amount of physical invigoration as will permit him for many years to come to conduct those researches which have hitherto proved so valuable and suggestive.

I do not know Signor Naja, of Venice. I certainly have not, so far as I am aware, ever met him in my peripatetic wanderings; but I do think that there must be many other photographic artists in Venice beside him, and some that are rather better, if we accept the estimate given of him and his works by "A. J. W." I have access to a folio of views in Venice, none of which bear the name, as artist, of Signor Naja, but most of these works are really excellent. They cost only tenpence each in Venice, and I unhesitatingly affirm that they are far superior to many photographs taken in England and offered for sale at a guinea. It appears that the secret of cheap photographic art in Venice is due to the fact that the dark room in which the photographer prepares his plates is, in most instances, within a few minutes' walk of the most picturesque, notable, and graphic subjects in that historic and once world-famed old republic. The facility with which fresh negatives may be obtained prevents any local artist from using old or bad ones; and competition, while it tends to keep down the prices for such works, also ensures the keeping up of the quality. I do not imagine that photographic operators receive high pay in Venice, and it is possible that the dealers there are satisfied with small profits.

When the large stock of indecent prints and negatives of Mr. Henry Hayler were seized by the police a month ago (the largest seizure of the kind ever made) it was stated that some of the more objectionable of the portraits were recognised as those of the artist's wife. This, it seems, is an error; and it arose from the police having mistaken for his wife one of the numerous professional models employed by Hayler. Many of the negatives seized are reported to be veritable works of art as regards the lighting and arrangement of the figures; and, as special furniture and accessories were made for most of the pictures, the pecuniary outlay involved in this trade must have been enormous. Hayler had a large number of artistic and photographic acquaintances, by whom his art powers, especially in the direction of sculpture, were well recognised. As no charge is made against him of having offered any of these productions for sale, a curious question might arise as to the right of the police to seize such property. As Mr. Hayler has, however, "retired" from this country, it is now almost certain that the right of the police will not be questioned, and that the negatives and pictures will be destroyed.

A good deal having appeared in the Journal of late concerning the uses of aniline colours in photography I am in a position to add to what has been already written by giving, from personal experience, an excellent way of making a deep, ruddy, orange glass for the studio window, and which, when subjected to the bromide of silver test, shuts out most effectually all the actinic rays, while still admitting sufficient light by which to see to work. It consists in collodionising both sides of the glass that is to be treated, using a strong, tough collodion for this purpose. When the film has dried one side is treated with roseine—a deep, red, aniline dye, procurable at the drysalters'—and the other with aurine. I used the former as an aqueous, the latter as an alcoholic, solution. The plate of glass thus treated will become of an exceedingly beautiful orange colour. The surfaces should afterwards receive a coating of varnish.

What is a pound of collodion? This question has been put by Mr. Sutton. Owing to the greater specific lightness of a mixture of ether and alcohol than that of water, a pound weight of the former contains several ounces more than a similar weight of the latter—in fact, it comes to as near twenty ounces as possible; and, as there are this number of fluid ounces in a pint, a pound and a pint are synonymous terms when applied to collodion.

(To be concluded in our next.)

TECHNICAL EDUCATION FOR PHOTOGRAPHERS.

The unfortunate or, perhaps, as it may turn out, fortunate "bickering" of which the London Photographic Society has for some months been the arena has called forth a host of suggestions for the improvement of photographic societies in general, and of the London Photographic Society in particular. It is no doubt true that those who are in the midst of a violent thunder-storm are scarcely in a position to reason with calm philosophy on the cause and probable effects of the "elemental war;" while those who only watch at a safe distance are able not only to appreciate the grandeur of the display, but, also, reasoning from past experience, to see that, although probably dangerous to some of those who are in its centre, it will certainly clear the atmosphere, and inaugurate a season of fair weather. The same observation is, no doubt, applicable to a certain extent to the internal commotion in the London Photographic Society. I believe, however, that, although some good and useful members may, in consequence of the misunderstandings, be lost to it, there are enough of good men and true left to take the reins in hand, and carry out the work of reorganisation in such a way as will not only re-establish it on a permanent basis, but make it really more useful than it has ever been.

Although, however, I consider that most of the suggestions are not only unnecessary but inapplicable to the London Photographic Society, I do not think they should be altogether lost sight of. My intention, therefore, is rather to put them into form, in the hope that they may be taken up and turned to practical account. The suggestions referred to may be classed under three heads:—First, that photographic societies should turn their attention altogether, or almost altogether, to the various branches of science with which photography is connected. Second, that the London Photographic Society should be converted into a sort of national peregrinating institution, similar to the "American Convention," or the "British Pharmaceutical Conference"—a satellite of the British Association. Third, that the Society take high ground—that the letters M.L.P.S. after a man's name should not merely signify that he was anxious to learn and willing to communicate, but that he had already atained to a certain degree of perfection, and might with more confidence, in virtue of the possession of these letters, be entrusted with the execution of the portraits of the family group, or the sun-picture of the newly-purchased estate, with its beautifully-situated mansion-house.

I do not agree with those of your correspondents who would thus define the work of a photographic society. I rather think it should be, as it has hitherto been, a neutral platform on which may meet all who are interested in our art—those who know much, as well as those who know little—the great object being that, just as when objects of varied temperatures are brought into contact there is a constant tendency to the equilibrium of heat, so shall there be a gradual but certain bringing about of an equilibrium of knowledge—not, however, as in the case of heat, by one body losing and another gaining, but, as the teacher always learns while he teaches, by a gradual and constant increase in the general knowledge of all concerned. In addition to this there is the frequent meeting of members face to face, by which little angularities get rubbed off, and trade jealousies are removed or materially lessened, while the intercourse between amateur and professional is found to become beneficial to both. In short, a photographic society should be a kind of mutual improvement association, in which all meet on equal terms, and where each communicates whatever information he may possess or acquire for the benefit of all the other members.

Although I thus do not consider that the suggestions classed under the three heads already mentioned come fairly under the operations of the ordinary photographic society, I am still decidedly of opinion that they might be combined, and with certain additions made to form an association or institution from which the whole photographic brotherhood would derive much benefit.

Notwithstanding much that has been written in praise of the work of photographers in other countries, I believe that for the honest, untouched work of the camera, either in portrait or landscape, and especially in the latter, England is quite able to maintain a front place; but I know also that some of those who occupy the foremost rank are most ready to bewail their want of the technical knowledge of the materials and processes which mechanically they manage so well, and would be the first to support any efficient and practical effort by which, perhaps, not only themselves, but their successors, might readily acquire the desiderated information.

Of course I am well aware that the absence of technical knowledge is not confined to the photographic profession, but it is only with it that I have at present to do; and although one can hardly expect that those who have advanced themselves to a position in which all the material comforts of life, and more, are easily secured, will give themselves to the necessary study, it is to be hoped that the large body of assistants, who are by-and-by to be the masters, only wait for a favourable opportunity to become thoroughly acquainted with the nature and properties and the laws which govern the materials and forces on which their operations depend. That this information is much needed there can be no doubt. A look through the correspondence of photographic serial literature bears only too ample evidence of the fact, while a little conversation with a large majority of the devotees of the camera would make it still more apparent.

As an example of the little attention that is paid by some would-be photographers to that with which they ought to be most concerned, I may mention a case which came under my observation recently. A young man, not by any means deficient in ability, served an apprenticeship of four years with one of our leading professional photographers, and during that time had the ordinary opportunities of acquiring a knowledge of all that could be taught. The nature and properties of the chemicals used, however, could hardly have formed part of the instruction, as, on the termination of his apprenticeship he intended to start as a landscape photographer, and, having got his first commission to do some work at a distance, he sallied forth fully equipped, but only to return after three days, with disappointment as the result of his labours. Having been applied to for help out of his trouble, I found that he had, to secure immunity from breakage, carried his bath of eighty ounces in a tin flask which had been purposely made as a decided improvement over the ordinary Winchester quart, or watertight bath. That our friend was not without ability is shown from the fact that, disgusted by his first attempt at photography on his own account, he threw it up as a profession and took to the brush, and his pictures are not only well spoken of by the critics, who sometimes know little of the subjects on which they write, but have this higher proof of excellence—they meet with a ready sale.

This is, of course, an extreme case; but columns might be filled with examples equally absurd, though probably less glaring. Nor is the want of knowledge of which I complain confined to our own country. At a recent meeting of the American Institute one member is reported to have said, in speaking of his developer—"A chemist told me that sulphuric acid was the best to unite with iron, and wherever I had to use iron I would find it to be the most useful. Upon that suggestion I took equal portions of nitrate of potash and sulphuric acid, and then added water to make a stock solution. To this stock solution I would add an equal quantity of alcohol, and this was added to the iron solution instead of acetic acid." He did not seem to be aware that when sulphuric acid was added to nitrate of potass a decomposition took place, thus

$$K\,NO_3 + H_2\,SO_4 = H\,NO_3 + HK\,SO_4,$$

one of the atoms of hydrogen in the sulphuric acid being displaced by the potassium of the potass nitrate, forming acid sulphate of potass, the displaced hydrogen taking the place of the potassium, forming nitric acid, so that this latter, and not sulphuric acid, was what he had been using. Of course it is not at all surprising that one member at a meeting was not quite well read up in the result of his experiments; but the fact that no one attempted to put him right shows that technical knowledge is needed in America as well as in this country. A PROVINCIAL PHOTOGRAPHER.

ON THE FLUCTUATIONS IN THE CHEMICAL ACTION OF THE SOLAR SPECTRUM, WITH PROPOSALS FOR MEASURING THE SAME.

In his spectro-photographic researches with bromide of silver plates Dr. Vogel some time ago sought, besides discovering the action of various absorbing agents, to establish the chemical action of the spectrum on pure bromide of silver. But he found it impossible, in spite of care in using the same materials, to obtain uniform results. The action always extended, in varying degrees, into the violet and ultra-violet rays, and more or less into the yellow and red on the other hand. He was at first inclined to attribute these variations to an inequality in the sensitiveness of the plates; but several trials of plates placed side by side in the camera, and exposed together with two lenses of equal power, proved that the plates were not at fault—the variations in their sensitiveness were too slight to account for the differences in the spectroscopic image. The cause could only, therefore, be in the relative intensities of the spectroscopic colours at different times.

Now, it is well known that towards sunset, when the rays have to travel a long way through the atmosphere, the intensity of the violet side of the spectrum is very distinctly lowered, as is that of the red. In the spectrum of the setting sun violet often fails altogether. Bunsen and Roscoe also recognise that the chemical strength of the various rays is extinguished in the atmosphere in differing degrees at different times of the day. Both of these investigators, however, devoted but few experiments to the subject, and concerned themselves only with the strength of the action of the sun's rays as a whole. Without, therefore, taking into account the part which each particular colour took in the changes, they noted the weakening of the general intensity of the rays as the sun sank towards the horizon or as the barometer rose.

Bunsen and Roscoe also employed a photometer for ascertaining the degrees of sensitiveness of the red, yellow, and green rays—a plan little to be recommended. Dr. Vogel's bromide of silver plates showed these variations very much more clearly, and he has registered his observations in a tabulated form, which we shall append. The perpendicular lines of that table indicate the visible lines in the spectrum, and the horizontal lines show the extent to which the bromide film was affected by the colours of that spectrum under the conditions given as to sun's altitude, time of exposure, atmospheric moisture, &c. Thus, the first horizontal line shows the action of the spectrum to extend on the plate from about six minutes over H to about five minutes beyond D in the yellow.

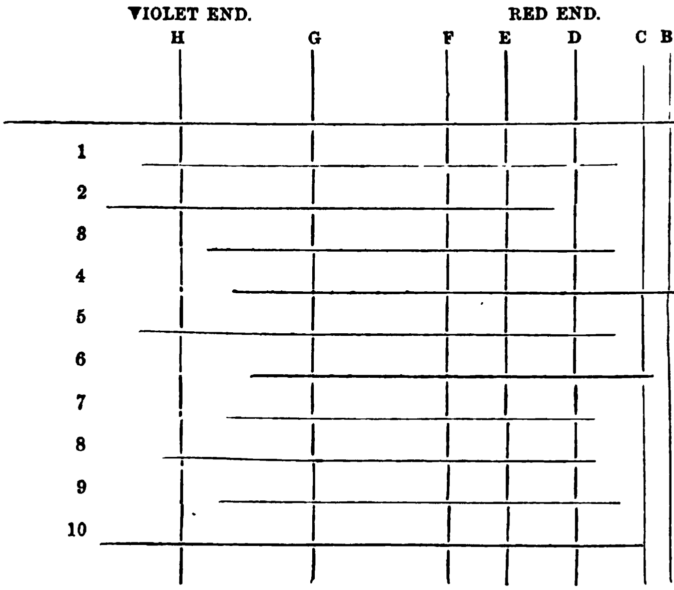
On the 17th of October, the sun being distinctly lower than at the former experiment, Dr. Vogel lengthened his exposure and the action extended into the ultra-violet; but, on the other hand, the orange or yellow rays showed no actinicism whatever—a circumstance not to be explained by the changed position of the heliostat mirror. The comparison between the results of this day and the next are interesting. The conditions as to exposure, sun's altitude, &c., were the same, yet the results are very different, and a similar variation occurs in the case of the experiments of the 29th and 30th October. In this case the sun was distinctly lower on the 30th, and yet the resulting image is stronger. The plates of the 1st November do not show a trace of the violet action, notwithstanding that the sun was higher, atmospheric pressure less, and, although the exposure was longer, the action in this instance, as on the 29th October, extended very far into the red rays. November permitted of only one experiment with the sun at 19.5°, but in December he got three at an altitude much lower than that. Two of these were made on the 7th—one in the morning and one in the afternoon—and these illustrate clearly the lessening of the actinic force of the violet rays as the sun goes down, while that of the red increases. Very noteworthy, too, is the experiment of December 31st. In spite of the low position of the sun a very extended image was obtained, extending into the ultra violet as well as far into the orange.

In all these experiments a completely clear sky was chosen. The origin of the variations in the chemical action of the solar spectrum cannot, therefore, lie in clouds or anything of that sort. Neither is it very likely that changes in the conditions of the sun's surface can have anything to do with the matter, for the time between the experiments is often too short to allow of any such taking effect. The observations are, however, as yet too incomplete to allow of any definite solution of the point being obtained. Generally, however, it appears that the action towards the violet side of the spectrum grows less when the red increases, and *vice versâ;* but the image indicated by line 10 shows an exception to this, and the moisture in the atmosphere has a good deal to do with it. In the comparable lines 2 and 3 and 4, 5 and 6 is the decrease of violet action and increase of red distinctly recognisable as due to this influence. This observation, however, does not agree with Jansen's experience, who found that when moisture prevailed the lines of absorption were numerous, not only in the violet rays, but in the red also.

It is to be noted, also, that the non-action of the violet rays on bromide of silver films by no means justifies one in coming to the conclusion that at the time of the observation being made these had become entirely non-actinic. The violet rays were always there, and visible enough to the eye, as well as capable of impressing the iodide film, of which the sensitiveness is greater than the bromide. Chloride of silver is more insensitive still than bromide, and hence it occurred that Roscoe and Thorp could not obtain with it any image in the ordinary daylight with the sun below 10°, while a photographic bromo-iodide plate gave an instantaneous image of the sun as it was setting.

These researches seem to indicate only the variations of the actinic powers of the coloured rays within the range of the capacity of bromide plates. Over the certainly existing variations in the action of the middle rays—indigo blue and green—they give no indication whatever; but it would be easy to construct an apparatus whereby that could be done. If one could make a spectral apparatus, which, instead of consisting of parallel sides and edges, should be wedge-shaped, it would be possible to get an image of unequal brightness, which would be darkest towards the wedge point, while yet the spectral lines would be sharper there. The brightness in any one part would be proportionate to the breadth of the side of the prism.

If we exposed a photographic plate in the light of such an instrument the spectrum would be extended horizontally, in an extent proportionate to the intensity of action of the violet or red rays, and not only so, but also vertically towards the dark horizontal side of the prism, according to the intensity of the individual colours. This would permit some conclusion to be drawn as to the relative actinic strength of these colours. The apparatus should be used without a heliostat, and only in the direct sunlight. Dr. Vogel proposes to experiment further with such an instrument. The following is the table:—



1873.	Sun's Altitude.	No. of Seconds Exposure	Barometer.	Pressure of Moisture at 2 o'clock p.m.
Octbr. 7. h. 2 0 p.m.	26·6°	7	335·25	5·06
- 17. - 2 30 p.m.	20·35°	10	338·38	2·74
- 18. - 2 30 p.m.	20°	10	336·21	3·33
- 29. - 0 30 p.m.	23·77°	10	339·82	2·17
- 30. - 1 40 p.m.	20·36°	10	336·7	1·77
Nov. 1. - 11 42 a.m.	22·85°	10½	332·2	2·84
- 12. - 12 33 p.m.	19·55°	10	340·77	1·62
Dec. 7. - 11 18½ a.m.	14·0°	15	343·52	—
- 7. - 2 3½ p.m.	11·14°	15	343·71	2·00
- 31. - 1 24 p.m.	12·03°	13	336·76	1·69

We believe the importance of these experiments will be at once seen. Nothing is more perplexing to the photographer than the varying effects which he obtains under what are seemingly identical conditions; and even a long experience will sometimes leave one utterly at fault as to what is the right exposure of a plate—a matter which is indeed ruled by a kind of instinct rather than by any clear rule. A few clear principles for guidance would be of the utmost value.

PHOTOGRAPHY AND SPECTRUM ANALYSIS.

[Cantor Lecture, delivered before the Society of Arts.]

Those of you who know best how the Society of Arts always places itself in the forefront of any movement which is likely to benefit mankind by the application of the various sciences to the practical affairs of life, may recollect that, as nearly as may be thirty years ago, the dawn of a comparatively-new science was brought before an audience in this room. If I look no longer to the *Journal*, but to the *Transactions* of the Society of Arts, Manufactures, and Commerce, as far back as the year 1843,* I find a paper there by the late M. Claudet, who then gave an account of the progress which had been made up to that time in an art and science which is now perfectly familiar to all of you. I refer to photography; and it is excessively curious that his lecture on the origin of this science and my present lecture on the application of photography to spectrum analysis are complementary to each other—so much so, that one may almost say that M. Claudet's lecture, admirable though it was, was incomplete, because he did not show in it, as of course he could not show, how certain matters which he referred to in that lecture have been dealt with in the light of modern science.

If you carry yourselves back to the year 1839, some four years before the lecture to which I refer was delivered, you will recollect that M. Niépce had at that time brought photography to a more practical realisation than it had been by any of his predecessors. He had then for some years allied himself with Daguerre, and the daguerrotype was already in existence. The action of iodine on silver, first discovered by Mr. Fox Talbot, had been fixed by the vapour of mercury.† Now, in the daguerrotype we had not the action of light in its ordinary sense; and men's minds were very much exercised as to what could be the real cause of the effects which were then being revealed. M. Claudet, in his lecture, points this out in a most admirable way, and I will summarise, if you will allow me, just some of the principal points to which he alludes. You had a beam of light falling on a plate. On this plate was a certain chemical compound. What part of the sunlight—or was it sunlight at all?—so acted upon this compound that you got an image more or less permanent? What more natural than that this question should be investigated by means of various tinted glasses? The solar beam which the experimenters then used they made to pass through glass, now of one colour and now of another. I can show you, by means of this electric lamp, nearly what they did. Imagine the lamp to be the sun; in the path of the beam differently-coloured glasses were placed. We have now the action of a red glass; we now change the red glass for another one, and now we have the action of a green glass. There was an immense deal of difference of opinion concerning the action of light as investigated in this way. In fact, I shall have shortly to show that M. Claudet and a very distinguished French physicist, M. Becquerel, were considerably at variance with regard to one particular point which came out from this kind of investigation.

But we had not long to wait. Sir J. Herschel, in the year 1839, pointed out that it was not a question of investigating these new qualities of light at all by means of coloured glasses; they should be investigated by means of the spectrum. Sir J. Herschel, in three papers, communicated to the Royal Society in the years 1839, 1840, and 1842, showed that the only philosophic way of investigating this problem was really by obtaining a pure spectrum, such an one as I now throw upon the screen. You see that we have at once, in different parts of this spectrum, exactly what we get at different times when we deal with red glass, yellow glass, orange glass, green glass, blue glass, and so on. And having such a spectrum as this to deal with, and supposing such a spectrum thrown on to the photographic plate, it is quite clear to all of you that, if there were something magical or unknown in the red rays which gave us this new action on the molecules of the particular chemical compound employed, or whether this magic really resided in the blue rays, we should at once have this pointed out to us, in the most unmistakable manner, by the action in the part of the plate on which the red image fell, or in the part of the plate on which the blue image fell.

Now, although Sir John Herschel was the first in this country to point out the extreme importance of this point of view, he was by no means the only one. Then, as now, there were distinguished Americans who were well to the front, and amongst them was Dr. Draper—the father of another Dr. Draper whom I shall have to speak of by-and-by. Those of you who are familiar with the enormous step in advance which was taken in spectroscopic investigations by Wollaston, who substituted a slit for a round hole, will perhaps be somewhat surprised to find that the first observations were conducted by throwing a converging beam of sunlight, giving an achromatic image of the sun on the plate, through a prism. This method of procedure of course did not go so far as a better one might have gone, but it went a considerable way. Sir J. Herschel, from his observations made in this manner, stated that he had found a new kind of light—a new prismatic colour, "lavender grey"—altogether beyond the blue end of the spectrum, not the red end. Professor Draper, on his part, also came in the main to the same conclusion, stating that he had discovered a "latent light."

* Vol. lv., p. 89.

† Fox Talbot, *Philosophical Magazine*, vol. xxii., p. 97.

When we have come from the year 1839 to the years 1842 and 1843 we find a great advance—an advance just the same as far as photography goes as Wollaston's advances on Newton was with regard to spectroscopic observation. Both Becquerel and Draper introduced, instead of this achromatic image of the sun, the simple arrangement of throwing sunlight through a slit and a proper combination of lenses on to a plate. The result was that on the 13th of June, 1842, Becquerel did what I may venture to call a stupendous feat.* He did what has never been done since, so far as I know. He photographed the whole solar spectrum with nearly all the lines registered by the hand and eye of Fraunhofer. I do not mean merely the blue end of the spectrum, as you may imagine, but the complete spectrum, from the "latent light"—the ultra violet rays of Draper—to the extreme red. Draper also did something like the same thing, but not quite the same thing, in what he calls a "tithonographic representation" of the solar spectrum. He gives certain lines in the extreme visible blue part of the spectrum,† certain other lines, which none but Becquerel had ever seen before (Draper's work being done nearly a year later); and in the extreme red—beyond the visible red of the spectrum—he gives other lines which even Becquerel had not photographed. This of course was such a tremendous revelation to both these men that you can imagine a considerable discussion arose, not only in their own minds, but in the minds of others, with regard to the work which they had done. Becquerel found, from an absolute comparison between the Fraunhofer lines which he had photographed and the Fraunhofer lines which Fraunhofer himself had registered, tremendous evidence in favour of the fact that this new chemical agent which was astonishing the world, whatever it was, was not something absolutely and completely independent of the visible rays. Draper, on the other hand, in his "tithonographic representation," had, for some photographic reason or other, not succeeded in registering the lines in the yellow, orange, and green part of the spectrum, although he had fixed the lines in the blue, in the extreme violet, and in the extreme red; and he considered himself justified by his experiments in coming to exactly the opposite conclusion to that at which Becquerel had arrived, namely, that the light, whatever kind of light it might be, which was at work in effecting this chemical change which rendered photography possible, was something absolutely and completely independent of the ordinary light which the retina receives.

This was in the year 1843. I need not tell you that by the year 1845, in which year M. Claudet read another paper before this Society, further investigations by means of the spectrum had shown that Dr. Draper's idea was heretical, and at the present moment you know it is the general opinion of physicists—an opinion founded upon the work which has been done to advance photography and other researches since that time—that the radiations which you get from any light source, from the extreme violet to the extreme red, differ only in the rate and in the magnitude of the vibrations which are at work, so that I claim for the application of photography to spectroscopy, as a first result, the establishment of this great fact—that the visible, the chemical, and the heat rays are really part and parcel of the same thing, that thing being a system of undulations varying in rate and wave length from one end of the spectrum to the other, whether you consider the visible portion or the invisible rays—those outside the blue in one case and outside the red in the other. But that is not all; I claim another thing for the application of photography to spectroscopy. Sir J. Herschel, so soon as he applied the prism, stated, in a communication to the Royal Society, that it was no longer possible to proceed with that branch of research under the best possible conditions, unless opticians would construct lenses which would bring the visible and the chemical rays into absolute coincidence. This is now done by our Rosses and Dallmeyers in the camera lenses, and that is the second great feature which I claim for the application of photography to spectroscopy.

The next step brings us down to the year 1852. In this year a paper‡ was communicated to the Royal Society by Professor Stokes, who had already announced his discovery of what has since been called fluoresence, "or the long spectrum of the electric light." Professor Stokes dealt in his first paper with the "change of refrangibility," or, as Sir William Thomson proposed to call it, "degradation of light," by virtue of which light, which was generally invisible to us, could, under certain circumstances, be made visible. It is no part of my present purpose to go into this magnificent paper—one of the crowning glories of the work of this century—at any great length; but you will see in a moment that, if it was a question of the degradation of light, then the invisible light to which Professor Stokes referred as being capable of being rendered visible must have been light outside the blue end of the spectrum, and not outside the red end. Professor Stokes, in his investigations, in order to get at this invisible light under better conditions, if possible, than those with which he commenced operations, tested the transparency of the substances through which the light with which he experimented passed, and the transparency of glass was passed under review by him,§ when he found that this invisible light, or whatever it was, could only get through glass with extreme difficulty. Continuing his investigations, he found that quartz, on the other hand, allowed this invisible light to pass. If you will allow me I will read an extract from Professor Stokes's paper of the extremest importance to our subject. After referring to these experiments on glass and quartz, he proceeds to say*:—"I have little doubt that the solar spectrum" (which you recollect had already been photographed to a certain extent both by Becquerel and Draper beyond the visible blue end of the spectrum), "would be prolonged, though to what extent I am unable to say, by using a complete optical train, in every member of which glass was replaced by quartz." He then adds that other substances which suggested themselves to him were not equally good. Then, further, that if this invisible light does get through quartz, and does become visible to the eye, it does not at all follow that it will be capable of being photographed; because already Professor Stokes, in order to continue his researches in fluoresence, had been, as it were, driven to photograph some of the results which he had thus obtained. I am sorry to say that, so far as I can find out, none of those photographs have ever been published.

Before I go further I think it will be convenient to throw on the screen some photographs of the solar spectrum, showing exactly what I mean by the "invisible rays;" and you will then see the enormous advance which Professor Stokes made the moment he introduced his quartz train, and enabled both the eye and the photographer to take advantage of a new region of the spectrum in its entirety, in order to investigate it. In a note to his paper communicated to the Royal Society, he shows that his anticipations, so far as the eye was concerned, was perfectly justified by the facts.† He says:—"I have since ordered a complete train of quartz, of which a considerable portion, comprising, among other things, two very fine prisms, has been already executed for me by Mr. Darker; with these I have seen the lines of the solar spectrum to a distance beyond H"—more than double that of P. So that the length of the spectrum, reckoned from H (the outside line in the portion ordinarily visible), was more than double the length of the part previously known from photographic impressions. I will now throw on the screen the spectrum of the extreme part of the visible portion. The eye generally can see the two dark bands which you see in the middle of the screen, called "H 1" and "H 2." The least refrangible part of the spectrum lies to the right. When Professor Stokes, therefore, stated that the solar spectrum was prolonged, he means that the part of the spectrum visible either to the unassisted eye or on a photographic plate after impression extends to a certain distance beyond these two dark lines. Another photograph I have here will show this better. In this we get a little more of the structure of the spectrum beyond H. We have still the less refrangible portion to the right. This is a negative, and, therefore, what we have as dark lines in the proper representation of the solar spectrum are seen as bright lines. We have to the left of H 1 and H 2 more of the structure than we had before; just about so much of the spectrum, in fact, as was photographed by Draper and Becquerel in 1842. The part which Professor Stokes rendered visible by means of his quartz train extended a considerable distance to the left beyond the part of the spectrum which you now see on the screen.

J. NORMAN LOCKYER, F.R.S.

(To be concluded in our next.)

* *Bibliothèque Universelle de Genève*, vol. xxxix.-xl., 1842, p. 341.

† *Philosophical Magazine*. vol. xxii., p. 360, 1843. For his earliest work see *Journal of the Franklin Institute* for the year 1837.

‡ *Philosophical Transactions*, vol. clxii., 1852.

§ Op. cit. Art. 202.

* Art. 204.

† P. 599.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 6	Edinburgh........................	The Hall, 5, St. Andrew-square.

PHOTOGRAPHIC SOCIETY OF VIENNA.

A MEETING of this Society was held in February,—Dr. E. Hornig in the chair.

A considerable part of the evening was taken up with merely local matters, such as the awards of the Voigtlander prizes and the appointment of the committee for acting in the same matter for another year.

The first thing of any importance was the mention of a method of obtaining enlargements by development on albumenised paper. The plan is practised by Herr C. Matzner, and the results, as described by Herr L. Schrank on his behalf, are said to be highly satisfactory. Hitherto in processes of this kind it has been extremely difficult to preserve the whites, but in these they are quite good. It had been Herr Matzner's intention to reserve the process, thinking that he might make a very profitable thing of it; but second thoughts had determined him to offer his process freely to the members if the Society would vote him a consideration for the gift. The exposure needed was only a quarter of that usually required in pictures of the kind.

It was not stated that the meeting were moved to accept Herr Matzner's offer.

Herr Fritz Luckhardt then read a paper by Herr J. B. Obernetter describing his "dusting-on" method of reproducing negatives—a method which Herr Luckhardt and others had been deputed to report upon. In making that report Herr Luckhardt said that they had been able without very much practice to get really favourable results. The general law is the same here as in other branches of photography. If fine negatives be desired the manipulation must be carried on with great care and cleanliness, and a certain delicacy of observation and dexterity of touch are also requisite. The special advantage which this process seemed to him to possess was the power it gave of multiplying negatives, so that not only could the prints from any given subject be more rapidly produced, but the original and often costly and valuable plate might be kept in reserve. These reproductions, too, might be made after the original had been carefully retouched and cured of all defects. He held the process itself in the highest esteem, and he possessed copies of stereoscopic negatives of his own which it was impossible for him to distinguish from the originals save by a mark. These he promised to bring to the next meeting. And not the least important part of the advantages was the ability one possessed of obtaining a thin negative from a dense one. A 10 × 12 plate of a landscape—one of the competing pictures for the prizes—took, in its original form, two days to yield a print, but a copy had been taken which was faultless, and which yielded several prints a day. In conclusion, Herr Luckhardt said there was one disadvantage connected with the process—that the using of the graphite made one as black as a chimney sweep, but that, he thought, was a thing that would be borne by his brethren without murmuring in consideration of the advantages which it brought.

The Chairman then directed the attention of the meeting to M. Melchion's researches as to the means and feasibility of shortening exposures, giving a description of his plan, which is already familiar to our readers. He thought that in the case of copying oil paintings very good results might be got by using various coloured glasses, and asked whether any of the professional members present had made any experiments in this direction. In the discussion which thereupon arose,

Herr F. Luckhardt stated that Dr. Monckhoven had confirmed the results of M. Melchion's proceedings, and he remembered himself seeing in the exhibition of last year a camera which had a special opening in front adapted in which to fit various coloured glasses.

One or two others said they had tried the plan, and found that they did not get good pictures by it.

Sundry minor matters having then been disposed of the meeting was adjourned.

At another meeting, held in March, Dr. Hornig occupied the chair.

After preliminaries and sundry unimportant matters,

Herr Luckhardt laid before the meeting a number of the copied negatives of which he had spoken, and also a number of prints which had been done both from the original and reproduced negatives, which were so like each other that it was only by referring to the marks on the backs that one could know which was which. He further exhibited some apparatus, and, amongst the rest, an American invention for using in the studio as a light regulator. It consisted of an inner and outer roller blind—the one of muslin, and the other of an opaque black cloth. By the one the side light could be softened at will, and by the other the background shaded. He had found it very useful.

A member wrote detailing his mode of preparing albumen, which is a substance, he represents, very difficult indeed either to get good or keep good. There does not seem to be anything new in what he states. He uses pure white of an egg, not over old, of course, having found that blood albumen was of no use, and proceeds generally in the usual way.

There was no other business of any importance at the meeting.

Correspondence.

Collodion Backing as a Preventive Against Internal Reflections.—Removing Stains.

Since writing before on this subject I have made some rather curious observations. The drying dead of the collodion film can be prevented by adding a little glycerine—six or ten drops to the ounce—and the film then dries perfectly transparent. When a film of this sort is examined by its reflection of a small and distant flame the result is quite different from that which is noticed in the absence of glycerine. With the plain red collodion film two images of the flame are seen—one ruby red and the other of the natural colour, both being sharply defined. With the glycerine film the sharp, red image disappears, and instead of it there is a large red halo.

This entirely confirms the view I expressed—that the red image of the flame comes from the outside surface of the collodion film and not the inside, and the explanation of its diffused appearance is this:—The collodion film without glycerine dries with its outer surface quite smooth and plane, but that with glycerine dries with a somewhat rough and irregular surface, and, consequently, does not give a well-defined reflected image, but only a confused halo.

A further insight into the action of these films may be got by rubbing the exterior surface of the glycerine film with the finger very gently. In this way it may be brought into a condition somewhat resembling ground glass, and its reflective power may be entirely destroyed. If, with the glass side of the plate next us, we now observe the reflected images we find that the red halo has disappeared. By looking very closely we see instead an extremely pale secondary image, of a *bluish* colour. This is the reflection at the surface of the film next the glass.

I mentioned in my previous communication that it was extremely probable that the red image formed by the outside surface of the film masked by its strong colour a fainter image from the other surface, and this is now proved to be the case.

As respects the bearing of these observations on the practical utility of this method of backing, the bluish image—which is what would cause blurring if any took place—is so faint that I cannot think it very important. No method of backing absolutely destroys internal reflection; it would be necessary, in order to accomplish that, to find a substance having exactly the same index of refraction as the glass used. A plate backed in this way, and exposed and developed, gave me a clean image, free from all signs of blurring. It is to be remembered, however, that the transparency of the film is essential—not that the film always needs to be transparent, but that exposure has shown in this case that when the film dries dead there is no optical contact, but that, probably by reason of crystallisation, there is air between. With a backing of annotta properly prepared there is optical contact.

The introduction of glycerine into the film of collodion backing prevents its drying hard, and renders it easily liable to injury. It is, therefore, not to be recommended when plates are to be long kept or carried to a distance. For work near home, or for dry plates for making transparencies, it is very well suited.

Experiments on various methods of colouring the film as a substitute for backing are in progress, and will be reported on when concluded.

On the whole, however, I do not see that this method of backing has any decided advantage over the ordinary mode, but rather the contrary. It is certainly better in one respect—that it can be carried to the very edge without danger of getting over, whereas, with a paste backing, one has to leave a little margin to facilitate removal. The washing off of the collodion is at least as troublesome as that of the paste; it splits up into a thousand fragments, and it is very difficult to get rid of them all by sponging, but they are found floating on the developing bath, and may stain the film, unless a colour has been used that is very insoluble in water, such as aurine, or the alcoholic extract of turmeric that has just been well washed with water.

I lately saw a recommendation (I cannot now recollect by whom made) to use for removing silver stains from the fingers a liquid made by dissolving an abundant quantity of iodine in strong liquid ammonia, and setting aside for a few days until the black precipitate redissolves, and leaves a clear, colourless liquid. Of all the methods I have tried for getting rid of silver stains this is the most effectual. Stains of silver emulsion, which are very disagreeable, can be completely got rid of by applying this detergent alternately with mixed ether and alcohol, and finishing with sand soap. The iodine solution will not, however, remove the stains of alkaline pyrogallic acid. For this stain I do not know of any effectual treatment.

In preparing this detergent it should be borne in mind that the black precipitate at first produced by the action of ammonia on iodine consists of the iodamides, otherwise called "iodides of nitrogen," amongst the most explosive of known substances. When dry this black powder may explode by merely moving the paper on which it has dried, and even under water it may be exploded by friction. Therefore the mixture should be placed aside in a corked vial for a few days until the black powder has redissolved, when all danger is over. With any common care the operation is a safe one; but carelessness or mismanagement might result in a very dangerous explosion. M. Carey Lea.

Philadelphia, April 13, 1874.

Coloured Carbon Enamels.—Dyeing Paper Prints.—The Right Time for the Introduction of a Novelty.—Doubly-Albumenised Paper.—Weston's Burnishing Machine.—Barnacles, and How to Deal with them.

The reader will find on another page a description of the new style of photographic portrait to which I have once or twice alluded in these letters as likely, some time or other, to interest the public and prove remunerative to the profession; but I have published it somewhat reluctantly (having been incited thereto by the remarks of our "Peripatetic" friend at page 159), because I have found on several occasions that it is better not to publish a novelty at all than to publish it at the wrong time, and I much fear that the present is the wrong time for the publication of the process in question. Should this prove to be the case I must hold the "Peripatetic" responsible.

As an instance of the misfortune of publishing a novelty at the wrong time I may cite a method proposed by myself some fourteen years ago of tinting or dyeing albumenised paper portraits with very dilute solutions of the aniline dyes—a dodge which is *now* being taken up with enthusiasm, although at the time I endeavoured to introduce it it met with no encouragement at all from the profession. At the time I mention, Mr. Bailey, of Wolverhampton, supplied six of these colours in a box, expressly prepared for the purpose according to my instructions; but years rolled on, and scarcely a dozen of these boxes of tints for dyeing paper prints were sold, although they answered the purpose to perfection, and effected a great improvement in the proofs, a thousand of which, *carte* size, might be permanently dyed for a penny. Now, however, the *right* time at which this novelty should have been introduced seems to have arrived; for I have just read with some amusement the following editorial remarks in the number of this Journal for April 17, at page 182. After speaking of the pleasing effect produced by tinting glass transparencies with aniline dyes of different colours, the writer goes on to say:—

"It is easy to see that dyes of this description may be applied to photographs as well as to glass. We are aware that delicate tints are applied to paper through the agency of aniline mixed with the albumen; but we believe that the desired tinting may be effected in a far more manageable way, namely, by immersing the finished prints in water containing a very minute proportion of whatever dye may be selected. We possess several prints which have been tinted in the way indicated after being finished, and the effect is really charming."

Of course it is; and I told the brotherhood so a dozen or more years ago, and provided them with the means of trying the plan at a cost of six shillings—but in vain! When our worthy Editors return to this subject shortly, as they promise to do, I hope they will do me the justice to say that this dodge was published by myself at the time I say, but fell flat upon the sceptical ears of the photographic community. They have only to refer to Mr. Bailey's advertisements of that period (of which I enclose a copy) to find that they include a box of six aniline colours especially prepared for the purpose named, and with full printed instructions for use. So much for the unfortunate mistake of publishing a novelty at the wrong time. An experimentalist like myself is very liable to do this, for the mind and the imagination go ahead much quicker than the hands can always conveniently follow; and professionals, no doubt, often act wisely in shaking their sagacious heads at the novelties which are suggested to them. But this extreme caution sometimes overreaches itself; for in one case the eye may be pleased by a deceptive specimen, and the judgment misled, whilst in another case the reason ought to have been convinced by a paragraph which may have been too carelessly read or entirely disregarded. An imposter may deceive us through the eye, whilst a philosopher may fail to convince our understanding. In an art like ours, where the ultimate results are addressed to the eye, a process-monger with specimens has a better chance of success than a writer of paragraphs however convincing.

I must also remind the reader, in reference to the editorial article at page 181, on the removal of portions of a negative by tincture of iodine —a most useful process—that this was described a dozen years ago in a pamphlet by M. Blanquart-Evrard, entitled *On the Intervention of Art in Photography*, translated into English by my friend Alfred Harral, and published, with two illustrations, by Messrs. Sampson Low and Co., at the price of one shilling. The intervention of art in photography was so highly appreciated at *that* time that the sale of the pamphlet in question only reached seventy copies! *Now* we hear of nothing else in all studios than the importance, *commercially*, of this very intervention of art. Nowadays art in photography is everything; but when that interesting little pamphlet appeared, from the pen of a man of real genius, high art-culture, and great practical knowledge of the processes of photography, the idea was pooh-poohed! Truly we live in a world of changes, and many a jewel may be turned up by grubbing amidst the lumber of the past. Do not, therefore, dear reader, consign to the butter shop your old photographic journals and pamphlets, but have them bound, and look back to them sometimes; you will be quite as often instructed as amused.

A word or two now with the "Peripatetic"—a most useful man in suggesting discussion, and keeping us all to our task, and even tripping us up when we deserve it. Whoever he may be—and I know no more than the reader—I hold him in awe. But now he asks for information, and says (see page 159)—"Will anyone be so obliging as to tell me the meaning of the word 'aplanatic?'" He knows, of course; but, nevertheless, I will venture to "be so obliging as to tell him." It comes from two Greek words, signifying "not to wander." The heavenly bodies in our system which revolve about the sun were called "planets" because they were supposed to wander. A lens is called "aplanatic" when a large direct pencil transmitted through it has all its rays brought accurately to a focus, the outer rays not wandering from the point at which the nearly central rays cut the axis. Optical science does not afford a better example of a lens which is, strictly speaking, aplanatic, than the common Petzval portrait lens; but none of our view lenses are aplanatic. It is difficult, however, to define accurately an aplanatic lens, because one would call a telescopic object-glass "aplanatic" in which the focal length was twenty times the aperture, whilst one would *not* call a single view lens "aplanatic" in which the same ratio between focal length and diameter of stop would give sharp definition. The best way of escaping from our difficulty would, perhaps, be to call all lenses which work with full aperture "aplanatic," but none of those which require a stop. At any rate, the term must be considered as misapplied when given to any single view lens with a stop in front. Such lenses do not, however, require to be aplanatic, because a small stop *must* be used with them in order to bring objects at different distances into equally good focus, and this small stop cuts off the outside wandering rays of what, without it, would be large pencils.

Doubly-albumenised paper is now becoming quite a fashion in France, and prints gain much in beauty in consequence. One peculiarity attending the use of it is that the prints lose less in the toning and fixing-baths, so that the printing must not be carried quite so deep in the pressure-frame. The finished prints are also rather warmer in colour. As a pure matter of taste I prefer a high glaze to a moderate one, and so, I believe, do many other people. The nearer we can approach to the surface of glass or enamel with our albumenised paper, the less vulgarity it will have in the eyes of an artist.

But there are two other modes of increasing the glaze on paper prints besides thickening the albumen. One of these consists in the use of gelatine and collodion, by a process which is still somewhat of a secret; for I frankly confess that I have not myself succeeded with any of the published methods. The other plan—which seems to be far simpler, and nearly as efficacious—consists in the use of the burnishing machine. I have now before me a beautiful *carte* portrait, by Messrs. Vandyke and Brown, which was burnished in one of Weston's machines, and nothing can be more satisfactory. Mr. Atkinson, of Liverpool, who is agent for this machine, has also done for me three *cartes* which I sent to him for a trial, and his success has been complete. It seems to me, therefore, that the American burnishing machine will supply a want which has long been felt in every studio.

The members of the London Photographic Society are to be congratulated on the event which took place at the last meeting, since it proves that a majority of them value their independence, and are determined to assert their rights. There is now a general impression that, during the last twelve years, the affairs of this Society have been in the hands of a clique who have not administered them with any reference to the general good. The gentlemen composing this clique seem all to have been members of the "barnacle" family; and if the poor old ship is ever to go ahead again, and not continue to lie like a log upon the water, the scraper must be pretty vigorously applied beneath her line of floatation. Who these barnacles may be would be perceived at a glance if our Editors could be prevailed upon to bestow a page of this Journal on a list of the office-bearers of the Society for every year since 1862. A glance at such a list would render all further comments unnecessary, when the gradual decadence of the Society and its present unhappy state are borne in mind in connection with it. So long as this clique continue in power scores of good men who would join the Society despise it and stand aloof. That the Society exists at this moment in a solvent state is due, I believe, mainly to the exertions of the three gentlemen who were compelled lately to retire from the Council board through the opposition of the barnacles. THOMAS SUTTON, B.A.

Stoak Vicarage, near Chester, April 24, 1874.

Photographers' Benevolent Association.—We have received a circular stating the objects of this Association, which are as follow:—To relieve members, their widows, and children when in distress, through sickness, death, or lack of employment, by means of immediate grants of money; to grant annual pensions to aged members, and to aid the unemployed members in getting situations by means of the employment register. Upon this register the wants of employers and assistants (members of the Association) are advertised free of charge. The mode in which the funds are administered is as follows:—When a member, member's widow, or children require aid from the Association application is to be made to the local or head secretary, who will supply a form of application for relief, which form is to be filled up, signed by the local secretary and two members of the Association, and transmitted to the head secretary, who will lay it before the board of management, when such amount will be awarded as is adequate to relieve the distress of the applicant. The relief will be in amount varying with the previous circumstances of the applicant.

A Liverpool Photographer Fined for Assault.—At the Liverpool Police Court, on Monday last, Mrs. Alice Hayes, wife of a furniture remover, who resides at 216, London-road, summoned August F. Vogel, photographer, 34, Brunswick-road, for an assault, said to have been committed on the 23rd March.—The complainant said that the defendant had taken some *cartes* of her aunt. She did not approve of them, and she (complainant) went to return them on the day in question. She told Mrs. Vogel that she objected to the likenesses, when the defendant came into the room and behaved in a very violent manner. He told his wife to "stick the likenesses in an envelope and send them to Africa." He seized complainant by the arm, attempted to throw her down the steps, assaulted her in a violent manner, and spat in her face.—The defence, which was supported by two witnesses, was that Mrs. Hayes went to the defendant's premises, threw the *cartes* on the table, said they were rubbish, called the defendant a swindler, and acted in a very noisy fashion; but the defendant denied that he had acted in the violent way imputed to him.—Dr. Vose (the presiding magistrate) said it was clear the defendant had taken the law into his own hands. What he ought to have done was to have sent for a policeman. It was a very disgraceful assault upon the part of the defendant, and he must pay a penalty of 40s. and costs.

The Features of Arthur Orton and Roger Tichborne.—The *Lancet* says it has been favoured with a very able pamphlet by Mr. F. Piercy, the memorial portrait painter, of Pall-mall, in which he seems clearly to demonstrate that the features of these two persons ought never to have been confounded together. The pamphlet contains lithographic reproductions of enlarged photographs taken from the portrait of Roger, known as the Chili daguerreotype, and from a portrait of Orton, which was one of the last taken, and most nearly approaches the Chili portrait in pose. By these one is enabled to see at a glance that the eyebrows, eyes, nose, and mouth of the two faces do not in the least degree resemble one another, excepting that they both possess "what is inseparable from humanity." The faces, in fact, belong to distinctly different types, and Mr. Piercey points out that a line drawn through the commissures of the eyelids forms in Roger's countenance an angle greater than a right angle with the mesial line of the face, but that the same angle in Orton's face is less than a right angle. There are lithographs also of Orton's left ear and Roger's left ear, which show that not only was Roger's ear pointed with an attached lobe, while Orton's is rounded with a free lobe, but that Orton's ear is three-quarters of an inch longer than Roger's. Two portraits of the artist's right ear are given, the one taken in 1857 and the other in 1873. There is no mistaking the identity of these two ears, notwithstanding the interval of sixteen years, and the fact that Mr. Piercy has himself "increased very considerably in bulk" during that time. The sun is a witness who is never likely to be tried for perjury, and under Mr. Piercy's guidance would be almost certain to confute any future false claimant to estates.

ANSWERS TO CORRESPONDENTS.

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

B. B.—The Almanac is still in print.

Joseph Tickell.—We shall try the polish and report upon it.

Thomas Fisher.—By the "red chromate of potash" is meant the ordinary bichromate of potash.

M. S. B.—The copyright of the photograph will remain your property for seven years after the date of your husband's death.

Inquirer.—So far as we are aware there is no rule in the trade in connection with apprentices, such matters being usually settled by private arrangement.

The International Exhibition.—An official announcement has been made that the French and other departments being now complete, they will be opened for the first time this day (May 1st). Hence we shall, next week, resume our notices of the photographs in the Exhibition.

Engine-Driver.—Squeegees are supplied by Spencer, Sawyer, Bird & Co., Rathbone-place. The price varies with the size. Papier Joseph is a light, flimsy kind of bibulous paper, which may be obtained from most photographic warehouses. We know that wax has no deleterious influence upon the silver bath, but we cannot answer for the others, having no experimental acquaintance with them.

Orthacto.—By using your lens with an aperture of $\frac{f}{16}$ breaking waves may be taken with great rapidity and perfection. A few trials will enable you to determine the best size of diaphragm to employ.

Chester.—Blisters in the collodio-albumen process may be avoided by the use of an old and porous collodion. We have known an unsuitable collodion rendered useful for this purpose by the addition of a few drops of ammonia.

G. B.—Any "traveller" who tells you that the method of enamelling paper pictures which we have described is patented is guilty of untruthfulness. It is quite true that a patent was obtained for it (in connection with some other things in photography), but that was a long time since, and the patent lapsed many years ago.

J. R.—1. There is no material better adapted for stopping out skies than Bates's black varnish or Brunswick black. The latter is improved by the admixture of a little spirits of turpentine and lampblack.—2. We are preparing an article on the moist process which will soon be published, and in which you will obtain all the information.

Indian Officer.—The yellow encrustation is persulphate. By exposure to the air the protosulphate of iron becomes persulphate. The best way to avoid this is to select the salt very carefully, fill the bottle quite full, and then place it in the kitchen oven until it is very warm. Now remove it, cork the bottle tightly, and seal it thoroughly with good wax. By adopting these precautions the protosulphate of iron will remain quite good and pure for years, notwithstanding all the vicissitudes to which your chemicals will be subjected during your projected travels in the East.

G. Weale.—You have not been quite correctly informed respecting Mr. Skaife's feat of photographing a passenger sitting at the window of an express train while in rapid motion. Had the circumstances been as you imagine they were, it would certainly have been the most wonderful photographic feat on record; but it was in reality an experiment which will not be ranked as a very astounding one when we explain that the photographer and the passenger were both in the same carriage, that the "subject" was sitting close to the window in profile against a bright sky, and that by means of a locket portrait lens of short focus the bright sky was photographed, showing the outline of the sitter against it in deep shadow without any detail.

Count Rondi.—To treat a broken negative so as not to show the fracture, or to show it as little as possible, a good mode of procedure is the following:—Lay the pieces, face downward, upon a plate of glass, and arrange the pieces carefully so as not to damage the edge of the collodion. Now join the pieces at the margin by means of wet pasted slips of paper; for being made wet when applied they will contract in drying, and thus bind the pieces of the negative closer together. When these slips are dry, take a piece of very fine and thin bibulous paper the size of the negative, make it wet and coat one side with gum; then lay it down upon the negative, pressing it closely in contact, and allow it to become quite dry before raising the negative. If any difficulty be experienced in obtaining bibulous paper of the kind recommended, use strong tissue paper instead.

Rev. B. Williams.—This correspondent thinks it would form a useful append to our article of last week, in which we described an albumenising establishment, if we would give a few particulars concerning the nature and properties of albumen itself. We commence, then, by giving Liebig's analysis of this complex body, which is—

Carbon	53·5
Hydrogen	7·0
Nitrogen	15·5
Oxygen	22·0
Sulphur, unoxidised	1·6
Phosphorus	0·4
	100·0

If albumen be spread thinly upon plates of metal it may be desiccated, and will then keep good for an indefinite period, ready to be dissolved in water when required. This desiccation is quite distinct from coagulation, for when coagulated it is no longer soluble in water. The addition of a lump of camphor or a few drops of ammonia, as well as other antiseptics, will preserve it for many months.

Received.—W. G. Smith. In our next.

METEOROLOGICAL REPORT,

For the Week ending April 29, 1874.

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

These Observations are Taken at 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
23	30·18	SE	51	54	79	48	Fine
24	30·20	WNW	52	55	66	47	Dull
25	30·15	W	56	59	68	54	Dull
27	30·23	E	53	57	76	50	Fine
28	30·26	E	53	58	65	51	Fine
29	30·35	NE	45	50	—	42	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 731. Vol. XXI.—MAY 8, 1874.

THE LONDON PHOTOGRAPHIC SOCIETY.

A special meeting of this Society has been arranged to take place immediately after the business of the ordinary meeting to be held on Tuesday next, chiefly to nominate a President, three Vice-Presidents, and eighteen members of Council, inclusive of Treasurer and Secretary, to fill as many vacant places as may exist, and that a second special meeting will be convened at the earliest practicable date afterwards to carry out the elections.

It is of the utmost moment to the wellbeing of the Society that a good and strong working executive, which will fairly and honestly represent all shades of opinion and all interests in the Society, should now be formed. It is, therefore, hoped that both metropolitan and country members who are really interested in the Society for its own sake will attend this meeting, and come prepared to make at it such nominations as they deem best. But, in order to prevent further delay, it is obviously necessary that each member who nominates a councillor or officer shall have ascertained that he is willing to give his services to the Society if he be elected. One of the first acts of a new, strong Council should be to settle the revised code of laws, in accordance with the wish of a general meeting of the members.

There are some of the old friends of the Society who think that it cannot stand without all its old props. This of course is a question that can only, and that now must, be solved by direct experiment. The issue is entirely in the hands of the Society. Let the members return a good working Council, possessing the confidence of the majority, and in a brief interval of time there will be a very satisfactory demonstration of what such an executive can accomplish. Meanwhile, the Society cannot too strongly mark its sense of the public spirit and good feeling of the senior Vice-President, Mr. John Spiller, who in a passing emergency has preferred the general interests of the Society to all considerations of a more personal and narrower character.

It is not definitely known how many of the old rulers are going to desert the Society, or how numerous the vacancies will be found to be; but, if those who were elected refuse to act, others will certainly be placed in their positions who will appreciate the honour of being specially selected to promote the best interests of the Society.

ON THE CUSTOM OF TRADE IN THE SELLING OF PHOTOGRAPHIC CHEMICALS.

In the Journal of April 17th the question has been raised as regards the merits of the method adopted in selling photographic chemicals; and our valued correspondent actually makes the following remark:—"I observe with surprise that some of the leading makers of collodion in England sell it by the pound. Can any of my readers kindly tell me what is meant by a pound of collodion? Does it mean a pint? If so, why not call it a pint? A pint and a pound are surely not synonymous." The difficulty in understanding this point is, no doubt, due to the fact that if a man order a pint of collodion, or any other liquid chemical, he is supplied with it without comment.

Now, these remarks show that among many photographers the actual custom of the trade in chemicals is not known; and, when we consider what an important element the amateur photographer is in society, we do not think it will be time wasted to devote a short space of our Journal this week in explaining the exact position the consumer holds in relation to the manufacturer. The fact is that collodion is always sold by the pound—never by the pint—and by the pound avoirdupois.

There are three weights in use in this country that concern the photographer—the ounce avoirdupois, the ounce troy, and the fluid ounce. The latter is, in fact, the same weight as the avoirdupois ounce of water when at a temperature of 60° Fah. The real unit of all these weights is the grain—originally so named from our seed grain—and which is the weight of the seeds of *Abrus precatorius*, commonly called "crabs' eyes." This seed is still used in India as a grain weight.

There may be a few special systems of weights and measures, such as that of the jewellers, which is based upon the carobe *(ceratonia)*, the origin of the carat, now so generally in use; but with the special weights peculiar to individual trades we have nothing to do.

First, then, let us remind our readers of the most important of these systems of weights—the avoirdupois—with its corresponding terms expressive of fluid measure.

One grain.
One ounce = 437·5 grains.
One pound = 16 ounces, or 7,000 grains.
One hundredweight = 112 pounds.
One ton = 20 hundredsweight.

The fluid measures, or measures of capacity, are—

One minim = 1 grain (·91).
One fluid drachm = 60 minims.
One fluid ounce = 437·5 grains.
One pint = 20 ounces.
One gallon = 10 pounds, or 70,000 grains.

These weights are not only those partially introduced into the *Pharmacopœia*, but is the system generally adopted over the British possessions. On the continent we have the metric system.

We also have the troy pound and its division, which differs entirely from the above:—

One ounce = 480 grains.
One pound = 12 ounces.

Thus we perceive that, although the ounce is larger by 42·5 grains, the pound troy is smaller than the avoirdupois pound by 1,240 grains.

Every chemical, solid and liquid, with the few exceptions which we will mention, are sold invariably by the pound; and the reason is at once seen on considering that were different liquid chemicals sold by measure there would be no uniformity, owing to the different gravities. Thus, a pound of chloroform will measure about ten and a-quarter fluid ounces. If a customer order from a wholesale house a pint he would, of course, be supplied with twenty fluid ounces; but he would be charged at a certain rate per pound. We believe that there is also one exception, which is confined to some of the Poor-law contracts—from habit, or some old-fashioned method, tenders for supplies are printed in pints. In the days when these forms of contracts were printed the pint meant was the old-fashioned wine pint of sixteen fluid ounces. Now the imperial pint is always understood, which is twenty fluid ounces, or one-eighth of a gallon. Even in these contracts they are really priced according to their relative weight.

To revert back to our real object, namely, the custom of the trade in selling liquid chemicals; we can state that all fluid chemicals are sold by the pound avoirdupois, with two exceptions. These are rectified spirits of wine and distilled water. Even alcohol is retailed per pound. All chemical products are also sold per pound avoirdupois, with the exception of gold, silver, and platinum, which, in the metallic state, are sold troy, but when transformed into their salts are sold by the other weight; thus we buy silver by the ounce troy (480 grains), but we buy nitrate of silver by the ounce avoirdupois (437·5 grains). Even on the continent, and France in particular, the same custom prevails; therefore we hardly understand the remark that "in France collodion is always sold by the litre," which is truly a fluid measure.

In French commerce the drugs and chemicals, fluid or solid, are sold and invoiced by the kilogramme and gramme. It is true, at the same time, that a kilogramme of water will be a litre capacity; but this fact applies to that fluid alone, and such an example only corresponds to the somewhat similar one of spirits of wine in this country, which is the exception, and is sold by measure. The specific gravity of this liquid is ·838 as compared with water. Therefore a pint measure is almost exactly a pound weight (a pound measures $19\frac{1}{10}$ ounces). One kilogramme is the fluid weight, therefore, of a litre of water, and weighs in English weights two pounds three and a-quarter ounces twelve grains.

We have already remarked that the cause of the universal use of weights in buying and selling chemicals is due to diversity of specific gravity or weight in different liquids, which will be evident from a glance at a few of the general chemicals in use by the photographer. Thus, 1,000 parts of these different liquids will weigh as follows:—

Sulphuric acid	1,843
Glacial acetic acid	1,065
Water	1,000
Alcohol	·795
Collodion (Mawson's)	·781
Ether	·720

[Also see an article upon specific gravity in our number for January 23, 1874.]

If we wish to know how much bulk a pound of any liquid will occupy in ounces, it is only necessary to divide sixteen by the specific gravity, whatever that may be, of the liquid. Thus:—·720 is the specific gravity of ether—

$$\frac{16}{\cdot 720} = 22{\cdot}23 \ (22\tfrac{1}{4} \text{ ounces}).$$

Therefore a pound of pure ether will measure one pint two and a-quarter ounces. Or glacial acetic acid, being 1·065 specific gravity—

$$\frac{16}{1{\cdot}065} = 15 \text{ ounces.}$$

Therefore a pound of glacial acetic acid would measure only fifteen ounces. Also a pound of collodion, with a specific gravity of ·780, will measure 20·4 ounces. If we want to reverse this, and to find out how much a pint of any fluid will weigh, we merely multiply the specific gravity by twenty, and we get the weight in ounces. Thus, our collodion having a specific gravity of ·780 would weigh $15\frac{1}{2}$ ounces to the pint, because $\cdot 780 \times 20 = 15{\cdot}6$.

THE SILBER LIGHT.

Before giving a description of the new Silber lamp we consider it desirable to say a few words on lamps in general, and those of the highest order in particular, avoiding, however, all reference at present to the lighting by gas of any kind, according to the popular meaning of the term; for, speaking strictly, the various kinds of oil lamps are all gas lamps, more or less perfect in their design and construction.

Previous to the time of Argand, lamps were exceedingly crude and imperfect instruments; and although much skill, taste, and money were lavished upon the mere frames or oil-holders of the lamps, the burners were retained in their state of primitive simplicity. Hence, notwithstanding their artistic designs, the noble metals in which they were often constructed, the rich jewels with which they were frequently adorned, and the perfumed oils by which they were fed, the lamps of olden time possessed but sorry illuminating powers; and such has been the advance in the science of illumination, and in the application of that science, that the cottager at the present period possesses a far purer and better light than did the occupant of the palace previous to 1789, when Argand brought his investigations to a practical issue. From that date the science of artificial lighting advanced somewhat steadily until within the past few years, when its rate of progress has materially increased in rapidity.

The Argand burner has never yet been, and from its character never will be, superseded by any other—at least for the purposes of general illumination—although it has been made the subject of very great improvement and modification. It consists in the use of a cylindrical wick so arranged that a current of air passes upward through the centre while another current ascending outside of the tubular wick is deflected, by means of a contraction in the chimney, against the flame, which is thus rendered more intense owing to the more perfect consumption of the carbon and the reduction in the size of the flame. A chimney, or its analogue, is an essential requisite in the Argand burner. That analogue may, and sometimes does, assume the form of a large lantern. It may, indeed, assume any shape provided this fundamental principle be kept in sight—that no air is admitted to it except what is first brought into contact with the flame. For a long period the air has been deflected towards the flame by means of a contraction in the glass chimney; but this method of intensifying the light is being generally superseded by a metallic or "solar cap," as the small piece of apparatus used for this purpose is designated in magic lantern phraseology, for we may here state—what is probably known to most of our readers—that gentlemen who have to do with the magic lantern feel a more than usual degree of interest in the subject of artificial lighting.

Many years ago a flat disc of brass, known as the "Liverpool button," was introduced into the centre of an Argand flame and a little above the edge of the wick. The effect of this was to cause the ascending central current of air to impinge against the flame and force it outwards. This ensures perfect combustion, but the cup-like form of the flame is disliked by many—in which dislike we certainly share.

But neither by means of the impact of the outer current of air against the flame nor by means of the Liverpool button have we ever been able to see a burner or wick of large diameter used, especially with petroleum. With this most useful hydrocarbon the dimensions of the wick must unfortunately be much restricted when the ordinary Argand burner is used, otherwise a great escape of unconsumed carbon rapidly fills the room with smoke. It is at this stage we introduce Mr. Silber's improvements.

Sometime since we called upon Mr. Silber at his warehouse in Whitecross-street, and found him surrounded by every conceivable appliance in connection with lighting, both by mineral oils and gas. It was evident that he had entered into the subject *con amore*, and had imported into it an immense amount of ingenuity, talent, and perseverance. He was also able to secure the services of that potent ally—money—the want of which has resulted in the dissipation of many schemes for improving our illumination. No man can effectively enter the field of artificial illumination without the following requisites, all of them most important—a clear and well-defined knowledge of the goal to be reached, abundance of time at command, ability and perseverance to conduct protracted experimental research, and, lastly, large pecuniary means to (it may be) throw away. Night after night, during a period extending over some years, was devoted to these experiments, and large sums of money, amounting to some thousands of pounds, were expended in the pursuit of the spectre—perfect combustion—which had hitherto eluded men's grasp; for any one who has had occasion to try even a few experiments with lamps of various kinds of construction will be aware of the great expense at which such tentative trials must be conducted. In the construction of a lamp perfect combustion was found to be dependent upon a great number of small things, no one of them very important in itself, but each helping in an appreciable degree towards the desired gaol. The chronometer of the old makers was, as far as theoretical construction goes, quite perfect, although not found to be so in practice. To the more modern improvers—we drop the word "inventors" if you will —it was left to show what could be done when principles already recognised were properly carried out; hence in the world of horology, we have our Arnolds, Dents, Frodshams, *et hoc genus omne*. So with lighting: perfection depends upon the appreciation of, and attention to, little things. Silber, while admitting the perfect soundness of the central current of air, concluded, nevertheless, that in the application of the principle the functions of this current must be analysed; hence, as a result, he put it under such control that, at least in his most powerful burners, not a single atom of air is allowed to pass up through the central aperture but must do duty in feeding the flame with oxygen. To do this one, two, and sometimes three interior tubes are required, some of which have a kind of bell-shaped upper end, by means of which the ascending current of air is thrown direct against the flame, acting antagonistically towards the current outside the flame. Thus, what between the impact of the ascending outer current and that of the inner current, the flame is perfectly supplied with oxygen and the carbon is thoroughly consumed, and is consequently exceedingly white and pure. The perfection of the light depends upon the nicety with which is carried out long-previously-recognised principles in illumination, rather than on any startling innovation on these principles.

So much as we have at present said has reference solely to the Silber *lamp*. But, in a subsequent article, we shall have occasion to speak of the application of the principle of perfect combustion as applied to lighting by gas. We may, however, state meanwhile that a large burner, constructed by Mr. Silber for a friend and correspondent, and which has been placed at our disposal for observation and criticism, is the largest and most perfect petroleum Argand lamp we have ever seen. The wick was one and a-half inch diameter, and the light was such as to eclipse, by its power, the gas-lights in the room. Such a light as this is what photographers seek as a substitute for the lime and magnesium lights in the production of enlargements, or for the exhibition of enlarged views of transparencies by means of the magic lantern in the lecture-room. If Mr. Silber will devote his great talents to the providing of a still more intense light, *totally irrespective of expense*, by which the quality and power of the oxyhydrogen light may be still more nearly approached, he will, in the event of success, cause his name in all future time to be placed among those forming the vanguard of photographic improvers.

RETOUCHING.

It is somewhat strange that in this age of bookmaking no one has given us a volume on the "Social, Moral, and Educational Influences of Photography." We are sure the subject is one of great interest; and as there is ample material for both pathos and humour it could not fail, if well written, to prove successful.

Thanks to the introduction of the convenient and ever-popular *carte de visite* every family has got its album, and some two or three; and many a morning call and evening visit, that would otherwise be dull enough, are by their means made not only tolerable but really pleasant, and sometimes profitable. The collection of family portraits is, of course, a never-ending source of conversation. Even the most inexcitable mother, who is usually silent on most other subjects, waxes eloquent on the virtues and prospects of each member of the family, scattered, it may be, over the four quarters of the globe, but who, through the influence of these much-prized pictures, appear to have an abiding presence in the home circle rather than the long, perhaps final, separation which in reality exists. Hardly less interest attaches to the album which contains the portraits of the men and women we admire. Hero worship exerts its influence more or less over every mind, and such a collection affords probably the best, as it certainly is the simplest and cheapest, mode in which it can be indulged. But it is more than that: it is also a valuable teacher of contemporary history. We are sometimes apt to read with scant attention the daily record of passing events; and, in the rapid whirl with which even important occurrences succeed each other, much that ought to be remembered is obliterated and forgotten until recalled and fixed in the memory by a study of the features of the men by whom they were brought about. This kind of personal introduction seems, in fact, to impart an objective interest in the actors, and, of course, an equally personal interest in their actions naturally follows.

This being the case, then, it is certainly a matter of vital importance to see that the portraits in such collections are not only as permanent as our processes will admit of, but that they shall be faithful transcripts of the original, and not merely pretty pictures idealised out of resemblance, according to the whim or caprice of the producers. We are, of course, aware that the art of portrait painting is one of the very highest, and that amongst its followers have been and are numbered many men of such genius and ability that they could and can transfer to the canvas not only the material likeness, but almost the living soul. Men of such power are, however, comparatively rare, and their work only shows, by contrast, the character of the miserable daubs sometimes allowed to pass muster as works of art by those who know no better. Now, although photography cannot hope to compete with the higher walks of portrait painting, it can nevertheless be made to give not only "the lifelike transcript that the child can see," the "very other self in form and feature unmistakable," but also some glimpses of the bent and calibre of the inner life. If it be true that photography can do this, it is equally true that it ought never to be allowed to do less. This is the standard which each operator should set up, and unflinchingly consign to the washing tub every negative that does not reach such standard. How far this is done becomes an inquiry of considerable interest, and to it we now turn our attention.

During the past week we have had an opportunity of examining the collection of one of our friends, who for the last ten years has got up an annual album, each containing about one hundred *cartes*. The collection is thoroughly miscellaneous, and fairly represents the state of our art in that particular branch, not only as respects time but also locality. So far as beauty of result is concerned there is an immense difference between the earlier and later albums. Those of eight or ten years ago contain, no doubt, some good pictures by the few master hands, but the greater number are flat and meaningless. Under-exposure and over-development is the characteristic of most of the work; while, as a rule, the principle on which the lighting has been arranged was to get as much light as possible, without special regard to the direction from whence it came. As we come down year by year there is gradual but manifest improvement, especially in the intensity of the negatives; and those of two or three years back show an almost entire absence of the objectionable white patches which spoil the earlier work, and which are never seen in the "human face divine." Along with this desirable improvement there is, especially in the later volumes, a softness and delicate beauty—that indescribable something—which instantly elicits, especially from our fair friends, the exclamations—"How charming!" "How exquisitely pretty!" "Who did that? I shall go and have my portrait taken there!" &c., &c.

On a slight examination merely there would seem to be really some cause for the admiration. A closer inspection, however, creates a doubt as to the real value of the seeming improvement, especially if we meet with the portrait of an intimate acquaintance. Suppose it should be our mother-in-law, who we have the best possible reason for believing is at least over fifty, and the wrinkles on whose forehead we have ever regarded as in her case natural beauties. In the picture, however, they have been ruthlessly obliterated, and her revered face otherwise tampered with to such an extent that she appears to be at least ten years younger than her daughter. This is not a mere imaginary instance, but an example of what is of almost daily occurrence in many parts of the country. We are cognisant of a case which occurred last summer, in which one of our friends received from his aunt, who was residing at a fashionable watering-place, a portrait of herself, with, we presume, the view of showing how much she had improved in appearance. She had frequently pressed him to get married, and he, thinking the portrait was that of a lady whom his aunt considered suitable, replied that, although the picture was no doubt pretty, the face was too insipid and the squint too glaring for his taste. We may add that his letter, or rather, we should say, the photograph, was very nearly the cause of our friend's name being cancelled in the old lady's will. The fact is, the unhealthy mania for retouching has in some places arrived at such a crisis that some effort must be made to put it down. Some person—we believe it was Mr. Ross, of Edinburgh—has said in one of his papers that "photography is nothing if not truthful;" and certainly a system of retouching which alters photographs beyond recognition is deserving of the strongest condemnation.

We are quite aware that those who are most guilty of the objectionable practice have this excuse—their customers like it, and that, therefore, it pays. That it does so we can readily concede, but that it will continue to do so we very much doubt. It may flatter the vanity of a few, but it will undoubtedly bring discredit on the art in general; and so its continuance is very much like killing the goose that laid the golden eggs. We have a higher opinion of the province of the portrait photographer than some of those gentlemen seem to possess of themselves. We hold that he should aim at being a teacher and leader, rather than simply a transcriber; that he should first climb to the position of artist himself, and then strive to draw his sitters after him, always keeping in mind that the highest art in reference to portraiture is first to secure an unmistakable transcript of the material form, and after that as much of the living, breathing, inner being as can be pictorially rendered.

We do not by any means object to retouching. So long as there are freckles, either visible or invisible, on the face, or flaws and specks in the collodion film, any means of obliterating them must be considered legitimate and unobjectionable; but beyond that we think the pencil should not go. Even this we believe to be, with ordinary care, unnecessary; and our belief is founded on the opinion of some of the most successful workers in the country, who have again and again assured us that, as a rule, their best pictures were invariably got from their most perfect negatives, or, in other words, that the quality of the print decreased just in proportion to the amount of work the negative required.

If, however, in spite of all that the photographer can do, the public still insist on retouching, something must be done to neutralise the misleading tendency of such pictures, and give that confidence which our art ought to inspire; although what that something should be is difficult to say. Until, however, a better method is suggested, we would recommend that there should be placed side by side with the print from the retouched negative one from the negative previous to such manipulation. In this way the lovers of the simply pretty would be satisfied, while those who value truth, and photography as its representative, would not have their feelings outraged.

One other suggestion, and we have done. In looking over an album of the present time the retouched picture carries on its face, to the initiated, ample evidence of its origin, but to the great mass of mankind there is no such evidence; and yet if they are not to be misled the story should be made plain. By the Adulteration Act he who sells a mixture of chicory and coffee is held free from blame if he mark his parcels as such. Let every retoucher place the word "retouched" on a prominent part of each picture, and the general public will then be aware of what it gets.

THE COMING PRESIDENT.

The Photographic Society of London is now without a President; other vacancies exist in its executive, but we confine our remarks chiefly to the presidency. On what ground or principle will the members fill that important post? Is it necessary that they should look out for a man of title, one of the "gilded knobs" of society, who will condescend to allow his name to be associated with the chief office? Or shall they search for a millionaire—and there are many about—who, if he cannot shed lustre, could spend money, and give prizes for all sorts of normal and abnormal pictures?—who could hold exhibitions at his own expense, give banquets, and have followers picking up the crumbs that are supposed to fall from such men's tables? Let us hope that such indignities are not in reserve for the Society.

A distinguished artist and President of the Royal Academy was the original President of the Photographic Society, but he did not remain long. Shall one of the great artists of the day be again invited? We fear, even if it were desirable, that none of these can be found available. Shall the experiment be repeated of going to the law courts and asking another of the judges to become President? There are at least two of these functionaries who are honourably associated with the art; but, seeing that the Society is only just emerging from the sad state into which it fell while it was under the rule of the Law, it is scarcely probable that anyone will venture on the trial. Shall the great men of science be tempted—say a Darwin, a Huxley, or a Tyndall? We fear they would say they know nothing of photography—that their minds are too much absorbed in their own pursuits.

In what direction, then, can an occupant be looked for to fill the vacant chair? To this important question we have one very clear and decided answer. To the members of this important Society—the original Photographic Society of Great Britain, and one of the best in the world—we offer this advice:—Be worthy, at this juncture, of the art you have established, developed, and cultivated. Have the courage to be worthy of the great invention of which you are the representatives, and do not let the great prize you have at your disposal be seized by any popularity-hunting nobleman; neither permit it to be placed within the reach of him with the large and open breeches-pocket. Follow the example set by other societies, and reserve your highest honour for the best men among yourselves. Abolish at once, as absurd and antiquated, the notion that you must have a live lord, or a red-handed baronet, or an ornamental individual at all, to preside over you.

In the days when these notions prevailed photography was a toy—a curiosity—a thing to be petted, patronised, looked down upon, and which it was a graceful act to recognise. The art has now passed into one of the potent influences of daily life; it has become a power in the land; it is an important industry, as well as a wonderful art; it supplies daily bread to the artisan, gives scope for the employment of capital, yields fortunes to the most gifted, and is an unmixed good to all.

It is, therefore, not only a pleasure but a duty for photographers to properly recognise their great vocation; and by no means the least important agency by which it has been propagated, and its great capacities brought out, has been by the establishment of photographic societies. This one of London is the great Parent Society; and it is no exaggeration to say that, for the time being, the President of that Society is the virtual representative of the art. Why should this important position be surrendered to a mere outsider? The time has arrived when photographers must be true to themselves and the art that is entrusted to them to practice and develope. They must honour those amongst themselves who have helped to raise it to its present proud eminence. The Society has passed beyond the condition of mere patronage. Let the members, then, be true to themselves, and let the few recognised honours be distributed among those who have honestly and earnestly worked for and deserve them.

The world of photography is so complete within itself it should be consistent. In the circles for the cultivation of astronomy, geology, geography, and the arts and sciences generally, the men to preside over the societies are selected, not for external distinctions, but for their special fitness, and for the service they have rendered to promote the particular subject. So it should be in the London Photographic Society. It is no use looking for outsiders to communicate honour to that body by presiding over it. The purpose of the Society is to cultivate photography in the very best way. The men most able to aid in this good work are the men to be honoured by their selection to fill the offices of the society established for its cultivation; and the highest of all should be given to him who, for the time being, is the most worthy of recognition for services past, present, and possible.

On these principles the officers of all photographic societies, and particularly of the London Photographic Society, should be selected; and we hope that in the election of the future President these sound principles will be recognised. There is only one other important condition that we particularly insist upon—that the individual selected shall be by instinct and by cultivation a *gentlemen*. We should hardly have thought this condition was so indispensable; but recent events have shown that a man may have many, if not most, of the requisite qualifications of a good president, but if he fail in this he is disqualified. A man must have the means of so conducting himself that if he have even the difficult task of saying unpopular things he shall not offend the members.

We ask our readers who are members of the London Photographic Society to carefully ponder over these more or less crude ideas, as guiding points in the important duties that will shortly devolve upon them. It should be the privilege of everyone who joins the Society to feel that, if he make himself worthy, apart from all private influence he can secure in the offices of the Society a due recognition of his labour; and that the highest office of all is the legitimate prize of those who by culture, public spirit, aid to the art, and general fitness prove the most worthy to occupy the important position of President of the London Photographic Society.

PHOTOGRAPHS AT THE INTERNATIONAL EXHIBITION.

[Second Notice.]

On entering the Albert Hall from the conservatory a collection of photographs on the "landing" arrests the attention of the visitor.

Directly facing the entrance are several landscapes by Robert Dahlloj, of Gottenburg. Some are of large size, but none of them are equal to the best English work of this class. The frames in which these pictures are displayed are of a somewhat unusual kind, and from the novelty of their design are worthy of attention.

Placed near to those to which we have just referred are a number of photographs by F. Bopp, of Innsbrück, Tyrol. These are of large dimensions, the subjects being bronze figures.

In the neighbourhood of the preceding works, but of a more attractive character, is the collection of Julius Gertinger, of Vienna. These consist of portraits of large size taken direct, and possess great delicacy.

In the small gallery specially devoted to photography there is a collection of photographs of casts in the Royal Architectural Museum, by B. Lemere, that must prove useful to architects.

The Woodbury Permanent Photographic Printing Company exhibit largely. Many of their pictures are of considerable dimensions, and prove to those who may yet be doubtful of the capabilities of this process that its products rival the most delicate class of silver prints. The views of *Holland House* are, we observe, from negatives taken by Mr. England. In addition to prints upon paper this company also exhibit a charming series of glass lantern transparencies of a most attractive tone.

J. Kosler's eight views of the Castle of Camenz represent clean and good work. The interest attached to the subject of his efforts is rather of a historical than of a pictorial character.

The *Portrait Study*, by Mr. Cecil Wray, represents a lady sitting writing. The impression conveyed by the position of the figure in this picture is decidedly that of isolation, being placed in the centre of the picture without any pictorial surroundings to balance it. Side accessories are wanted.

Several contributions have been sent by Mr. George Bruce. His pictures are distinguished by a lavender tone just a little too pronounced. Of this character is particularly his *Glossy Leaf*—a picture representing a girl with a background of leaves, which, by the way, would have been more effective had they not been quite so sharply defined.

The works of Lock and Whitfield are of a high order of excellence, showing great variety in the pose and treatment. Mr. Faulkner displays a frame containing over a hundred photographs of children, which are, as usual, exceedingly attractive.

The gum-gallic process (although why "process" should be indicated in a popular exhibition like the International is scarcely intelligible) is ably represented by Mr. Whiting, who exhibits three frames of capital little pictures taken by Mr. R. M. Gordon's popular process. Several of these photographs are remarkable for pictorial excellence. Very attractive, too, are the landscapes of Mr. William Bedford, who exhibits very largely. *A River Scene on the Conway* is one of Mr. Bedford's best pictures.

There is nothing demanding special notice in a collection of eleven portraits by Alois Beer; it is fitting, however, that we should say that they are meritorious.

The Berlin Photographic Company show several pictures of very large dimensions, and Mr. Croughton exhibits three portraits finished by the Vanderweyde process, which otherwise is not represented in this exhibition, so far as we have been able to see.

We shall resume our notice of the photographic department of the present Exhibition next week.

A NEW METHOD OF PREPARING EMULSION PLATES

The experiments which I have lately made with albumen in connection with emulsion plates have in all respects confirmed the results of those earlier trials which I lately described. The improvement which results from treating these plates with albumen is so well marked that I expect to adopt it in future, to the exclusion of all other methods. But I have also found a modification in the mode of preparation, the advantages of which will be sufficiently evident to those who may try it. I was led to this modification by the following considerations:—

The compound which albumen forms with silver is sensitive to light, and certainly forms an important element in the albumen processes. Silver in the form of nitrate is immediately and completely precipitated from its solutions by albumen when the latter substance is present in excess. This being the case, why should an emulsion plate be washed before being placed in the albumen preservative bath? There seems no reason for it except old habit. Would it not be equally reasonable to dip an ordinary iodo-bromised film in water before plunging it into the negative bath? The preliminary washing seems just as unnecessary in the one case as in the other.

To get a clear insight into this matter before experimenting with dry plates I coated a piece of glass with an emulsion, and, to make the test more severe, I used an emulsion with a large excess of silver nitrate, eight or ten grains excess to the ounce. Even this I applied in two coats, so as to have a large quantity of silver nitrate in the film. With the same motive—that of making the test the more severe—I made the albumen solution very weak, one per cent. only, half-a-drachm of albumen to six ounces of water, and into this I plunged my plate as soon as set. All this was done by daylight. The bath was washed backwards and forwards over the plate until the greasy lines had disappeared, and then a portion of the bath was poured off and tested with a soluble chloride for silver. *None had been dissolved out.* The plate was left some time longer in the bath, and the latter was again tested with the same result. Only by standing for a long time after the addition of the chloride a faint opalescence indicated the presence of a minute trace of silver, quite unimportant.

This experiment threw a broad light upon the matter. It was evident that a washing of the plate could have no other effect than that of removing part of the silver, and so far diminishing the quantity of albuminate. (It has been said that the preliminary washing, if carried, as I first advised, only so far as to remove the greasy lines, abstracts but little silver; but this is a mistake, as can be ascertained by testing the wash water.)

Dry plates were at once prepared on this new principle. In the next batch of plates made two were plunged direct into the preservative bath as soon as the film had set, and these two plates were so far superior to the rest of the series as to settle the question at once, and farther experience has served only to confirm this conclusion. The advantages obtained in this way are as follow:—

1.—Greater sensitiveness. Two plates carefully tested against the other plates made with the same emulsion and preservative, differing only in the one respect, received identical exposure. The plates, according to the new method, begun with precisely the same developer, were finished up to printing density in *one-fourth the time*, and with far less ammonium carbonate. The plates were all started with one grain to the ounce of carbonate, and one quarter of a grain of potassium bromide. This (with my usual dose of pyrogallic acid—

half-a-drachm of sixty-grain solution to four ounces of developing bath for development in a porcelain pan) brought the plates easily and rapidly to printing density, and would have carried them far beyond it. On the other hand, the plates which had been washed required to have two additions of ammonium carbonate; in all, four times as much, and needing also four times as long.

2.—The new plates showed more detail in the shadows and a cleaner deposit. In this respect the difference is well marked.

3.—The new plates showed much less irradiation, and less blurring. A leafless silver-maple tree, some sixty feet distant, projected its long, slender branches against a highly-illuminated sky. These branches were almost directly between the sun and the camera; in fact, the sun would have shone directly into the camera but for the projection of the piazza under which the camera was placed. Thus, these slender branches were in deep shadow against a sky brightly illuminated by the near sun. In order to bring out their faults none of these trial plates were backed. All the plates made in the old way showed more or less intrusion of the light upon these boughs (which on the plate were not much thicker than hairs)—they were converted into a sort of flat half-tone, becoming more and more misty and undefined towards their ends; but in the new plates these lines were as sharp and clean as if they had been cut out with a graver.

To this last quality I attach a very high importance. Every photographer knows the annoyance of having the light foliage at the edges of trees, when projected against the sky and unprotected by shaded foliage underneath, represented in a hazy, blurred way, and this blemish is often seen in otherwise perfect pictures. Though diminished, it is by no means cured by backing, because it depends more upon irradiation than it does upon blurring. When light falls upon the tissue paper under which an engraver works the tissue paper acts like a new source of light, and not only transmits, but sends part directly back, and other parts in all directions, laterally as well. The translucent bromide film acts precisely like the tissue paper, and the light thus diffused laterally causes the high light to intrude on neighbouring shadows. To this fault some sorts of plates are very much more exposed than others, and the new plates which I here describe are specially free from this very annoying defect.

It seems altogether probable that there are other preservatives besides the albumen which will admit of omitting the washing. This is a point which I have not examined, and do not consider worth examining. The advantages of albumen are such as to make the preservatives hitherto used with emulsion plates comparatively valueless. It is probable that some of these other processes would be benefited by omitting the washing, whilst others would not bear it, but would fog either in the preservative bath or in developing.

Albumen appears to be able to dispose of any amount of silver which may be introduced into the film. In the extremely sensitive plates which I formerly prepared with cochineal I found it necessary to keep down the excess of silver nitrate within very narrow limits; otherwise I got plates of inferior quality, wanting contrast, and difficult to intensify, especially if the exposure had been a full one. With these albumen plates, on the contrary, especially when not washed, any quantity of silver may be put into the emulsion. I use a rich collodion with plenty of bromides, and to this I add both a chloride and *aqua regia*. Such a collodion will bear any amount of silver nitrate, followed by albumen treatment direct.

The following formula will be found a good one:—To one ounce of solvents, using ether in slight excess, add—

Cadmium bromide*	6½ grains.
Ammonium bromide	1½ grain.
Cobalt of chloride	1 „

Add two drops of *aqua regia*, and sensitise with twenty-two or twenty-three grains of silver nitrate dissolved in alcohol. The emulsion is in its best state ten or twelve hours after mixing.

PRESERVATIVE.

Dilute Albumen.—Mix three ounces of albumen with three ounces of water and seventy-five minims of Beaufoy's acetic acid. Filter through paper or a sponge—the former being preferable, though slower.

Gum and Sugar Solution.—On a filter—best in a percolator—throw three ounces of hard white sugar, and pour on them a drachm and a-half of liquid carbolic acid. Wash half-a-pound of white gum arabic with cold water, and dissolve it in warm by pouring on successive portions, each left until syrupy; then pour these on the sugar, making forty-four ounces of solution, which, by reason of the carbolic acid, will keep for a long time, especially in a cool place. Take—

Water	8 ounces.
Prepared albumen	5 drachms.
Gum and sugar solution	10 „
Sixty-grain alcoholic solution of gallic acid	3 „
Sixty-grain solution of tannin in water	3 „

Those who do not care to prepare solutions can use—

Water	1 ounce.
Prepared albumen	40 minims.
Gallic acid	2 grains.
Tannin	2 „
Gum	10 „
Sugar	4 „

Very good results are also got without the tannin. Further experiments will be necessary to settle whether tannin is best added or not; also as to pyrogallic acid. With these investigations I am now occupied. The collodion will also give good results without the cobalt chloride, though I decidedly prefer to use it. It gives greater clearness without loss of sensitiveness. If omitted, the silver nitrate may be reduced to twenty or twenty-one grains.

These new plates have other advantages besides those I have enumerated. They show less tendency to spots and pinholes; indeed, I have yet to see the first of either in one of these plates. To those persons who have not pure water at command for washing the avoidance of this part of the process has no small importance. The manipulations are also reduced, and time saved, by having only one operation to perform after coating, instead of two.

M. CAREY LEA.

* Crystallised bromide is here referred to. It is best to dry it after weighing and before dissolving. If anhydrous bromide can be had it should be substituted, and the quantity be reduced to five and a-half grains per ounce.

NOTE ON HELIOCHROMY.

M. DE SAINT FLORENT does not appear to have yet exhausted his observations upon this subject, which have indeed been given in rather a snatchy way, so that they are somewhat difficult for ordinary readers to follow. The observations of so *habile* an experimenter are, however, well worth attention in any form, and the subject is one of too fascinating a kind, and yet too little known or worked at by most men, to render it safe to suffer any information on it to slip.

In his final paper M. de St. Florent, or the writer who records his experiments, deals with complementary colours, the action of coloured glasses, and matters of that kind.

On the first of these points he draws attention to the fact that M. Becquerel pointed out in his work on light that when the coloured images of the solar spectrum obtained on silver plates are immersed in ammonia the red end takes a greenish hue, and that this tint, which is complementary of the primitive colour, disappears when the plate is dry. Exacter examples have, however, been obtained with images on paper. The following are some notes on the point:—

Prints obtained with nitrate of mercury had been kept several months in a portfolio without having been washed. All had vanished save some negative outlines. But having immersed them for several hours in a concentrated bath of hydrochlorate of ammonia, and having exposed them to the light of the sun, it was observed with astonishment that the image gradually revivified and presented the complementary colours of the primitive tints. And the most curious part of it is that these prints in complementary colours are more stable than the others. M. de St. Florent says that it seems impossible to give a satisfactory explanation of this fact; all that can be done is to point out the singular analogy which seems to subsist between this phenomenon and that of accidental images. M. Plateau suggests as an explanation of these latter what may, perhaps, apply to the other. His theory was that the sheet of subchloride was a veritable mineral retina, which, after a certain time of repose, and under the action of certain substances, would resist the primitive impression received by an opposite reaction.

Complementary colours have been obtained in other ways, such as when on taking the image from the frame it is immersed in a bath of carbonate of soda, and then, after washing, in a solution of nitrate of lead. If, after again washing, it be exposed to the sunlight under a bath of chloride of sodium it presents, after a certain time, colours which are the complement of the primitive tints. Again: the same effects are produced when the prints are prepared with bichromate of potash, after Poitevin's method, and immersed, after exposure, first in feeble ammonia, and then in hydrochloric acid. And once more: these effects are obtainable by immersing a heliochromic image on tracing paper in concentrated nitro-muriatic acid—*aqua regia*.

Turning to the action of coloured glasses we find that if a sheet of chlorised paper, prepared as indicated in the earlier papers, be exposed to the sun under a violet or blue glass the chloride is reduced, and passes into the condition of a violet subchloride. The sheet having been placed in contact with a painting on glass after sensitising in a nitrate of mercury bath it is observable that the heliochromic image is produced with a much greater rapidity than if one had suffered the paper to blacken under the action of white light. The following experiment is more conclusive still:—

A strip of sensitised paper is exposed to the light in such a way that the first portion is covered with a violet glass, the second with a blue, and the third is subject to the direct action of the daylight. After a certain time the paper is withdrawn and sensitised with nitrate of mercury, and thereafter the whole of it is exposed under the same picture. Account is then taken of the number of seconds necessary to complete the exposure of each section, which is covered, when the action is complete, with black paper. It will then be found that the image is formed four times as quickly on that part of the paper which had been exposed below the violet glass as on the part exposed to plain daylight, while the part exposed under the blue will be only twice as quick. This result may be explained if we note the fact that the blue, violet, and ultra-violet rays, comprehended between the lines G and P in the spectrum, are the only ones which act in reducing the chloride of silver. Experience seems to prove, besides, that the formation of a subchloride is more rapid under the action of the less refrangible rays; so that there is reason for believing that the reduction ought to take place more quickly under the action of the blue or violet rays than under the influence of ordinary light, which represents the agglomeration of all the simple radiations. Besides, this reduction is more perfect, in that it forms a subchloride only, and not a mixture of that and chloride—this last arising, when white light is worked with, from the ulterior oxidation of the subchloride by the least refrangible rays. It is possible that in the substance thus formed the molecular state may be modified in such a manner that the chlorine in an active state may act more rapidly in transforming the white chloride. These experiments must, however, be carried further before it can be possible to decide.

As to the action of the least refrangible rays these observations have been made:—When a sheet of paper covered with subchloride of silver, and sensitised with nitrate of mercury, is exposed to the light behind a painting, and having interposed between it and the light a very feebly-coloured glass, it is to be noted that the image comes out very quickly with yellow or red tints, and very slowly with the blue or violet. Thus the less refrangible rays seem to hasten the oxidation of the subchloride; they are even, as was pointed out in the first part of these observations published some time ago, capable of acting alone. It is possible to obtain heliochromic prints by the long exposure to light of the simple subchloride of silver. Finally: it may be remarked generally that the action exercised on a sensitive substance by simple radiations is highest when the colour of the rays is complementary to that of the substance dealt with. This is the case with the divers substances sensitive to light which have been passed in review, such as iodide of silver, chloride of the same, alkaline bichromates, subchloride of silver, &c., and where it has been observed in what part of the spectrum the maximum influence exercised upon them has lain.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

The doings at the photographic societies during the past month have, as usual, been varied. The members of the London Photographic Society know best where the shoe has been pinching them, and there are too many really competent men in that body to render it for a moment questionable as to their possessing the requisite ability to conduct the business of the Society in a proper manner. It must, however, have been a pitiable sight to see the then President, who has arrived at years which entitle him to be designated venerable, and who only a few months before had told the members that he considered himself elected to the presidency for life (or "for ever," as the official report had it)—it must, I say, have been a pitiable sight to witness such a man withdrawing from the Society in a fit of petulance, amid cries of "shame!" and hisses. But desperate maladies require desperate remedies. Some cancerous disorders are so deeply seated as to yield only to the knife; and if amputation to the extent not merely of the President, but of the Secretary and some half score others, must be performed, it will, I trust, have the excellent effect of leaving the general body healthier and more robust in constitution than ever. Old societies resemble our trees—a great deal the better of the pruning-knife being firmly yet judiciously used.

* Concluded from page 208.

Talking of the London Photographic Society, the fair fame of one who has long been a member of its Council and a Vice-President, Mr. H. P. Robinson, seems in danger of being sullied. I do not for a single moment hold that there is anything in the least wrong in vending for the amplest amount obtainable any photographic secrets he may possess. Four thousand dollars seems, undoubtedly, at first sight. an enormous sum at which to dispose of retail that which cost wholesale only three guineas; but the article, I have no doubt, was presented to the retail purchaser in a more enticing form than when it was purchased wholesale by Mr. Robinson. Nor have I any objection to a person obtaining, or trying to obtain, a patent for anything he can claim to be really his own invention. Genuine inventors are justly entitled to every legitimate protection they can secure, and protection by patent is one of the very best. No doubt where the mistake (as you have said) has been made is that one who has for so many years been boasting he had no secrets, but gave open-handedly and freely every scrap of knowledge he possessed to the public, should adopt the *rôle* of the patentee or process-monger, even though he had worked *ab initio* the process to be vended, and had never paid Mr. Watson the sum of three guineas, or even so much as heard of his name. It is singular, too, that to the American public only—or to a section of that public—was to be entrusted the secret. From the determined—nay, decidedly uncourteous—way in which Mr. B. J. Edwards was treated when attempting to dispose of his method of enlarging to the American Convention, and the steps *some one* took to publish the process broadcast in the American serials, I have no doubt that a similar fate would have awaited the enamelling process, and that it, too, would soon have been published for the benefit of all who cared to study its details.

Who is the Claimant *now?* Two very clever pamphlets have been issued, both purporting to deal with the photographs of the original Tichborne, the original Orton, and the Claimant. From one of these we learn—or, more correctly speaking, we deduce the fact—that the Claimant is the real Tichborne, and from the other that he is Orton. Bravo—photography!

"Neôleo-peinture," it appears, is not a French invention after all, but was patented by Mr. Duppa in this country twenty years ago. I am strongly tempted to make a quotation from the wise literary King of Israel bearing on novelties, but I abstain.

The last meeting of the South London Photographic Society was devoted to some of the photographic applications of aniline. Aniline dyes are likely to prove exceedingly useful in photography. Suppose I was to colour a transparency blue, is there any means by which, going over it with a brush, I could discharge the colour where and when I pleased? If I mix up any acid effecting this discharge with gum water, so as to secure freedom from spreading, it indicates a way of colouring a sky by the application of a varnish, and of afterwards picking out clouds, mountain tops, and, in short, whatever is not required or desired to appear blue. Will this be the secret of the marvellously-even and transparent blues in the skies of some Spanish transparencies to be seen here a few years ago?

I observe that the subject of the stoppage of the phosphorogenic rays of the electric light by means of glass has been under discussion. Here is a nut for the Editors, or any other persons, to crack:—If glass stop these rays, how does it happen that there exists a scientific toy the action of which is based upon the fact that no such stoppage takes place? I refer to cases containing six or seven little flattened glass tubes, ranged side by side, and each filled with a metallic sulphide, prepared in such a way as to be phosphorescent, so that when the *electric*, magnesium, or sun light is allowed to fall upon them for a few seconds, and they are then taken into a dark room, they are seen to glow vividly, emitting, in due order, all the prismatic colours. If the glass act as it has been alleged to do, no such luminousness could possibly result. Could it?

With much pleasure I should have desired to make a "note" on the proposition of Mr. Vaughan that merit be a *sine quâ non* to be possessed by each candidate for admission to the Photographic Society. But the subject is too vast to be treated in a passing paragraph. Hence I leave it—at least for the present.

The apparent eagerness with which the members of the Photographic Society, at the last meeting, rose to throw cold water upon the collodio-chloride process is very remarkable. When Mr. Simpson advocated its claims before the same Society nine or ten years ago much apparent enthusiasm was then displayed. But *now* one says it is difficult and troublesome; another says the prints are lacking in permanence, and so on. Some profess a desire to be delivered from albumenised paper. Well, then, why not try carbon? Is *it* lacking in permanence? Is *it* a difficult process? Does *it* give results inferior to silver? Verily, photographers are hyperconservative!

TECHNICAL EDUCATION FOR PHOTOGRAPHERS.

In my communication of last week I showed—at least to my own satisfaction—what a photographic society ought and ought not to be, and also the necessity of some arrangements being made by which the technicalities of the profession should be taught more thoroughly than, as a rule, they have yet been. With the permission of the Editors I now proceed briefly to indicate how I think that this and many other advantages may be gained by the formation of a National Photographic Association, which, while doing no injury to any existing society, shall materially benefit the whole profession.

The work which the proposed association is intended to do will include—first, the bringing together annually of a great body of both amateur and professional photographers, who, although they have long known each other by repute, have not had an opportunity of meeting face to face, or of deriving from each other the benefits which naturally accrue from such meeting. Secondly, an annual exhibition of photographs, gathered from all parts of the country. Thirdly, the establishment of certain educational institutions where the technicalities of photography, including the laws of composition, optics, chemistry, &c., would be taught, and where diplomas could, after examination, be granted. For the attainment of these three objects I am sure there is sufficient *esprit de corps* among the great body of professional and amateur photographers to set the association going, if some man of characteristic force would only take it heartily up and set the ball rolling.

The members of the National Photographic Association would consist of all interested in our art who were willing to pay a subscription of half-a-guinea per annum; and I think I may safely predict that an income of at least £1,500 might in this way be obtained, which would be sufficient to defray all necessary expense.

The operations included under the first and second heads might consist in holding a meeting at the same time and place as the British Association, where papers should be read, new or improved apparatus exhibited, and where also an exhibition of photographs would be held. The arrangements connected with such exhibition —and, in fact, with the meeting generally—might be undertaken by local photographers, formed, *pro. tem.*, into a local committee for the purpose. This is the method adopted by the British Pharmaceutical Conference; it works admirably, and I know the conference has been of much benefit to the whole profession of pharmacy. I feel certain it would be no less beneficial to the photographic profession.

The operations embraced under the third head are undoubtedly the most important of all; but I think they may be carried out with equal ease and certainty. I would suggest that in, say, London. Edinburgh, and Dublin suitable premises should be obtained and fitted up with all necessary appliances for the teaching of the technical knowledge which every photographer should possess. This might at first be limited to the laws of composition; the nature of light; optics, so far as relate to lenses; and the nature and properties of the chemicals used in photography. The branches are so few that one teacher in each city might readily be found who could thoroughly do the work, and a fee of one or two guineas from each pupil would probably be found sufficient to remunerate him for his labour. In each city an examining body could also readily be found who should meet from time to time, and, on their favourable report, the association should issue its diploma, which would soon have a recognised value, and be eagerly sought for. Employers would naturally prefer assistants who had thus qualified themselves professionally, and the public would by-and-by begin to recognise the difference between the man who theoretically knows his work and the mere mechanic who does it because he has seen it so done.

There are, no doubt, some who will object to all this fuss about education; they have made money themselves without it, and think what has been good for them should be sufficient for their successors. In the early days of photography the general public knew little of art, and were satisfied with almost anything in the shape of a picture; but it is not so now. Photography has itself been busy as an educator, and as it continues to be so the public will, year by year, require a higher standard of work, which can only be obtained by the photographer gradually elevating himself to the mark. And why should he not do so? Men do not seek to enter the professions of law, divinity, or medicine without much preliminary preparation, and they should not expect to succeed in that of photography without the necessary qualification.

My scheme is, I know, crude and open to much improvement. I publish it simply for the consideration of those most concerned in the future welfare of the art; and I shall only be too glad if some one with more ability will take it up and give it such ventilation as will direct public attention to the necessity for more intimate association amongst photographers, more publicity for their best works, and better education on the part of both employer and employed.

A Provincial Photographer.

Our Editorial Table.

Ross's New Symmetrical Lenses.

These lenses, as we are informed by a circular, are intended for landscapes, architecture, and copying. A specimen has been placed at our disposal, with a request to subject it to the most rigid scrutiny, and to institute a rigorous comparison between it and the lens of any other maker to which we had access.

The first thing noticeable about the new lens is its very small size, considering the work it professes to do. When one not well acquainted with photographic optics sees a landscape lens of large diameter with a very small diaphragm placed at some distance in front of it, his first impression is that it would be quite as well if the lens were at once made the size of the diaphragm. A further degree of knowledge, however, would convince him that with a lens made of the material and of the curvature of the instrument in question no other arrangement would be possible. Lenses of a nearly plano-convex form require that the stop should be placed at a certain distance before marginal definition can be obtained; but for a considerable period it has been known that, by increasing the density of the material of which the lens is made, equally good definition may be obtained as before with much deeper curves. That is to say, if two meniscus lenses be made in every respect alike, save that one shall be very light crown and the other dense flint, the latter will possess a greater degree of freedom from spherical observation than the former; in other words, it will give better definition. But as deep curvature implies the approximation of the stop to the lens, it follows that by a careful selection of glass and curvature the stop may be placed quite close up against the lens, from which, in turn, it follows that the diameter of the lens need not much exceed that of the largest stop to be employed. To the late Professor Steinheil is due much credit for his researches in connection with lenses made altogether of flint glass instead of flint and crown; for we may observe that the conditions of achromatism do not necessarily demand glasses of different kinds, but are supplied in glass of the same description, provided samples of different dispersive ratio be used.

In the lens before us these principles appear to have been thoroughly recognised, and proper effect has, consequently, been given to them. As we have already stated, the new instrument is of small size. The lenses are achromatic menisci of considerable thickness and deep curvature, and are mounted so close together as to only admit of the stop passing freely between them. In sharpness of definition they are singularly admirable, judging from the specimen we have examined—in this respect far exceeding that of the doublets introduced in 1864 by the same firm.

One feature to which we attach great importance is the universality of the mounting—all the lenses, from the smallest stereoscopic size to that intended to cover a 25 × 21 inch plate, screwing into the same flange; and *that* flange, after all, is one of small dimensions and a standard size in its way, seeing that it is of the dimensions adopted for the stereoscopic lenses of Ross and Co., the excellent small rapid rectilinear and other lenses of Dallmeyer, as well as the stereoscopic objectives of Grubb and others.

The immense convenience of a universal flange can only be appreciated by those who have occasion to use lenses of various foci, and, above all, by those who go into the country to secure subjects for their cameras. By having every lens made to screw into the flange fitted on the camera front, and by having only one cap to answer the whole series, the gain is positively astonishing. If the photographic tourist arrive at the only spot from which a suitable view of a subject can be obtained, and find that it forms too small and insignificant a picture upon the ground glass, by this system the lens is removed, and replaced by another of longer focus in a few seconds. We rejoice at this attempt to do for photographic lenses what has been done so long and so very successfully in connection with microscopic objectives, which, no matter by whom made, are now all fitted with screws of identically the same size and pitch.

On the various grounds of diminished bulk, improved definition, and the general convenience secured by the interchangeableness of the lenses into one flange, we accord to the symmetrical lens of Ross and Co. a very cordial welcome.

Some negatives of test objects, taken by these lenses by Colonel Stuart Wortley and others, have also been sent to us for examination, accompanied by a request for a critical report; but this we must reserve till our next number.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 12	London	9, Conduit-street, Regent-street.
,, 14	South London	John-street, Adelphi.
,, 14	Manchester	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held on Tuesday evening, the 28th ult., at the Free Public Library,—the Rev. T. B. Banner in the chair.

The minutes of the previous meeting were read and passed.

Mr. Wharmby exhibited a number of negatives taken on plates prepared by Mr. W. B. Bolton's process. He had succeeded very well with them, but, on varnishing with spirit varnish, the film, owing, no doubt, to the soap in it, rose in small blisters and spoilt the negative. Other varnishes might be used to avoid this.

In reference to two exceedingly fine transparencies which were handed round,

Mr. W. Atkins made the following remarks:—At our January meeting I brought for your inspection a number of transparencies prepared by Mr. Bolton's new process. I then stated that Mr. Bolton had prepared, in my presence, a dozen plates in the very short time of seventeen minutes. Five of those plates were used for transparency printing the same evening; the rest have since remained by me. With the object of again drawing your attention to this important process, I have this evening brought two transparencies in order to afford you an opportunity of judging of the keeping qualities of the emulsion. The previous pictures exhibited were prepared on the 10th of January, from an emulsion made by Mr. Bolton about three weeks previously, and it will, perhaps, be remembered that the exposures given ranged from six seconds to a fraction of a second to gaslight, the object being to test crucially the rapidity of the process. With a moderately-dense negative five or six seconds was found to be quite long enough. Since that time, owing to business engagements, I have been unable to do anything in photography until last evening, when I printed the two transparencies I now lay before you. No. 1 is a plate prepared by Mr. Bolton in January, the emulsion being then three weeks old. This plate was exposed under a rather dense negative for ten seconds, the development being effected with a three-grain solution of pyrogallic acid, four drops of a five-grain solution of bromide of potassium, and four drops of ammonia solution (one part of ammonia to twelve of water); no silver was used to intensify, nor any gold to tone it. Plate No. 2 was coated and dried last evening from the remains of the emulsion used by Mr. Bolton on the previous occasion. This has remained in my possession since January, and has been untouched, except to shake it up occasionally. This plate was exposed under the same negative as No. 1, receiving identically the same exposure and development, the final result showing not the least difference between the two plates. The emulsion used is now eighteen weeks old, and has lost none of its original good qualities It can, I think, be fairly claimed that, having stood the test so long, it will keep indefinitely.

The Rev. H. G. Palmer exhibited some collodio-albumen negatives on plates prepared by a Manchester firm. He liked them very much, and had been very successful with them. The exposure was quick, but the development exceedingly slow.

Mr. O. R. Green suggested that a number of negatives might be developed together in glass dishes. They could then be examined from time to time, so that the whole would be finished in much the same time as one.

The Rev. J. D. Riley showed an excellent transparency taken by Mr. Sutton's moist process.

Mr. Castellain related his experiences in changing very sensitive plates in a Howard's tent. Although the sun faced the window the plates showed no signs of fogging.

Mr. Ellerbeck said he had worked the wet process with the tent, but if he coated the plate within the tent the fumes from the ether made it impossible to work without some covering for the eyes. He thought of having glass or talc fitted to the mast, as there was a difficulty in avoiding dust when coating a plate in the open air.

The Council was requested to arrange for an excursion.

The meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A meeting of this Society was held on April 10th,—M. Ferrier, a member of the Council, in the chair.

In going through the foreign journals M. Perrot brought several matters of value under the notice of the meeting. From the *Photographisches Archiv* he culled, amongst other things, the following formulæ for use in retouching negatives:—

No. 1.

Gum arabic....................................	1 part.
Water	7 parts.

No. 2.

Bichromate of potash	3 parts.
Water	7 ,,

Add to the gum as much of the bichromate solution as will suffice to turn it to the colour of Madeira wine. It will then be ready for use, but must be kept in the dark. The negative is fixed, washed, and dried in the ordinary way, and is then coated with this mixture, dried, and put in a dark place. It is afterwards exposed for half-an-hour, and thereafter varnished with an insoluble and very hard matt varnish. On this surface, by means of Faber crayons Nos. 3 and 4, retouching of every kind can be proceeded with as on paper.

Formulæ for the preparation of keeping sensitised papers were also given from the same journal, the features of which differ in no way from those already published, unless it be that the citric and tartaric acids are used in the same bath with the silver. Subsequent fumigation is in all cases needful.

A reference was made to the practice of M. Tulley, recounted by him in the last number of the *Bulletin Belge*, and which consists of intensifying his negatives before fixing with old gold bath. The precipitate of gold communicates to the impression a surprising intensity, and, at the same time, a harmony of transparency and brilliancy quite remarkable.

M. Franck stated that he saw no objection to M. Tulley's practice; but talking of the *Bulletin Belge* reminded him of another matter. Some time ago the editor of that journal had recommended the addition of a little water to the collodion, whereby great softness was given to the negatives. He had tried it, adding not twenty, but ten, per cent. of water, and had got a very good negative, only that the film had a tendency to crack in the shadows. This trouble was got over partially by adding a little castor oil. He had succeeded by this plan during a journey in Spain, only that the bad quality of the alcohol had then caused frequent splitting of the film.

M. Ferrier observed that softness in the collodion might be obtained much better by other means than by adding water, which was always, in his opinion, hurtful. Aqueous collodion gave always a sort of gauzy film, and the desired softness might be got by using precipitated cotton.

M. Chardon said that all precipitated cotton did not give the like results. From numerous experiments he had found that the most excellent samples were those obtained with boiling water, as recommended by M. A. Martin.

M. Thiel, Sen., presented a number of excellent carbon prints obtained by his process, which the Society very much admired, and thanked him.

The Secretary read a letter from M. Fargier, indicating a means of obtaining carbon prints by the immersion of the insulated film in a bath of coloured gelatine. The process is briefly this:—In three ounces of water dissolve one and a-quarter drachm each of perchloride of iron and citric acid. This solution is poured in a tray, and a sheet of *papier de pâte* floated on it for a minute. After drying in the dark this sheet is exposed behind the negative, and afterwards floated on a gelatine or blackened gum bath containing a trace of bichromate. It is then immediately washed in tepid water if gelatine be used, and in cold if gum, when the image will be developed, and nothing remains to be done but to strengthen it, and remove the oxides and varnish. About a drop of a concentrated solution is required per half-drachm of coloured gelatine. The image is less vigorous when this dose is augmented, and it disappears in the water when the quantity is less. It might, perhaps, be preferable to employ M. Marion's *papier mixtionne* instead of the gelatine pellicle. The reactions in this process are easily followed. Light reduces the perchloride to protochloride, and this in turn reduces the bichromate to a sesquioxide of chromium, which, combining with gelatine, renders it insoluble. On the other hand, citric acid accelerates greatly the action of light, and opposes the action of the perchloride of iron on the gelatine in the light of the picture. M. Fargier avows that "the process is not without difficulty, and that it may hardly prove of much interest compared with those already known."

When the Secretary had read the letter, he stated that M. Fargier's discovery was no discovery at all. M. Poitevin had described the same thing as far back as 1863; and he turned to the reports of the Society's meetings of that year to prove it, reading a passage giving substantially the same process.

The CHAIRMAN, however, observed that this coincidence did not detract from M. Fargier's merits, for he was evidently quite in ignorance of the older discovery.

In reference to a note on emulsions, contributed by Mr. M. Carey Lea, M. CHARDON said that it was possible to add an excess of nitrate of silver to the emulsion without being obliged on that account to use *aqua regia*, which always retarded the action of the light; but then at least twenty-four hours were required to allow the bromide of silver to be completely formed, even when the mixture was shaken from time to time. Emulsion processes were still far from being understood. One day, for instance, he (M. Chardon) was misled. Wishing to make an equivalent emulsion he used equal parts of nitrate of silver and bromide. He found, however, in washing that free nitrate was given off, although the bromide should have been in excess. The negatives obtained in this way were irreproachable, and he had tried it again, but without success. Success should be attainable, but he had only hit it by accident. In his opinion the most important element of success lay in the gun-cotton.

M. FERRIER said that that was so. He had tried the two emulsions prepared by Mr. Stillman—the one with gun-cotton, the other with papyroxyline—and had found an enormous difference in sensitiveness between the two. With the one he got a good image in two minutes, and the other required at least five.

M. CHARDON added that, in his experience, Mr. Stillman's recommended addition of resin was not a good thing, in that it diminishes the porosity of the collodion, and hinders, in consequence, the action of the developer. He would continue his investigations in this field, and communicate, from time to time, his experiences to the Society. All he could then say was that he had tried to compound an emulsion with chemically-pure bromide of silver, finely divided, and had found it completely insensitive.

M. PENAUD, member of the French Aeronaut Society, begged the Photographic Society to try to photograph a bird in the act of flight. The thing might be very difficult, he said, but the scientific and aerial navigation problems which it would help to solve made it well worth the attempt.

The CHAIRMAN said the thing was impossible. No distinct movement could be obtained—only a blur, which would teach nothing. Still, the Society could try the experiment, as it had already done, and he himself meant to do so.

A melancholy communication was made of the death of one of the fathers of the Society, M. Humbert de Molard, to whose memory a fitting tribute was paid.

No other business of any consequence came before the meeting, which was shortly afterwards adjourned.

Correspondence.

LAST MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—M. STEBBING'S DRY PLATES AND NEW DEVELOPER.—BLURRING.—RETOUCHING.—ALBUMENISING.—ENAMELLED CAMEO-VIGNETTES.—THE RAPID SERUM DRY PROCESS.

THERE was but a small attendance at the meeting of the Photographic Society of France, on the 10th of April, on account of the state of the weather on that evening, which is described as having been "detestable"—so much so that but few of the members had the courage to face it. Nevertheless there was a goodly display of prints in fatty ink—some by M. Thiel's process, which is a modification of Albert's, and others by the latter process as employed by MM. Romler and Jonas. It is said that these latter specimens were equal to the finest proofs from the copper plate.

Scarcely a meeting of the above Society passes without the exhibition of numerous specimens by the various photo-mechanical processes of printing, which proves how enthusiastically these processes have been taken up in France. The Woodbury process, however, still holds its ground, both as regards economy and the beauty of the proofs, notwithstanding that they require to be fixed, trimmed, and mounted.

M. Stebbing's dry plates have now achieved a high reputation amongst French amateurs, and they seem to possess every good quality except exalted sensitiveness. Their rapidity may, however, be increased by the use of an alkaline developer before the application of the usual pyrogallo-nitrate—a fact which their author has been rather slow to discover. The following is the mode of development which he now recommends. Prepare these solutions:—

No. 1.	Distilled water	1000 c.c.
	Carbonate of ammonia	100 grammes.
No. 2.	Distilled water	200 c.c.
	Bromide of potassium	1 gramme.
No. 3.	Alcohol at 40°	100 grammes.
	Pyrogallic acid	5 ,,

Put the plate (say 7 × 5 inches) into a dish, and pour upon it—

Distilled water	200 c.c.
No. 1 solution	10 ,,
No. 2 ,,	10 ,,

Leave it a minute in this solution, then remove it; add to the solution ten c.c. of No. 3, mix well, put in the plate again, and leave it until all the details are visible in the shadows. Then wash it well, pour over it some pyrogallol with acetic acid, and intensify with pyrogallo-nitrate in the usual way.

The novelty of this mode of developing consists in first treating the plate with the ammonia and bromide before adding the pyrogallol. I once, by a mistake, developed a Liverpool dry plate in this way, and it did not turn out a failure.

I tried, a few months ago, two batches of plates from M. Stebbing, and they gave bright, dense negatives, but rather hard and slow. The films were beautifully even, and they bore the washing and fixing extremely well. Nothing could be better in this respect. They had all the appearance of dry plates prepared with bromo-iodised collodion and excited in a bath, and they did not wrinkle or blister in the least. There was no red backing.

In reference to Mr. M. Carey Lea's remarks on the prevention of blurring, at page 194, if aurine be added to plain collodion it is perfectly soluble, and stains it of a deep orange colour, than which no colour is more non-actinic. Now, if the back of a dry plate be coated with this, the optical contact will be perfect in every part, and there will be no dead patches, such as appear to occur when coralline and rosaniline are added to the collodion.

May I be permitted to say that there are some remarks in Mr. Bruce's paper, at page 196, second column, on retouching or remodelling which deserve to be printed in large letters of gold, and suspended in many a studio? May the truth, as he has so ably put it, quickly prevail! The whole of the second half of that second column deserves to be read many times.

But with respect to collodio-chloride paper, now that we are introducing such excellent methods of enamelling and burnishing our prints upon albumenised paper, we may, I think, cease to trouble our heads about so costly and coquettish a process as that for which our friend has pleaded before the London Photographic Society.

Whilst listening to a traveller's wonderful story the other day a whimsical idea occurred to me which may, perhaps, hit the fancy of some such enthusiastic albumeniser as Mr. Skinner. The narrator was telling me of a visit he had once paid to the South Stack Lighthouse, near Holyhead, and was saying that the huge rock upon which that lighthouse stands was literally covered with the nests of sea birds filled with eggs! In short, eggs were to be had there not by thousands but by millions, and for the mere trouble of picking up. Surely, then, this locality ought to be the paradise of an albumeniser, and should cut out Hammersmith, even though no Bermondsey curriers might be at hand to buy the yolks!

The albumen of ducks' eggs is colourless. Can any one tell us what is the colour of the albumen of the eggs of gulls, cormorants, gannets, and other sea fowl? At any rate, their eggs are eatable, for the people at the South Stack Lighthouse make omelettes of them to their hearts' content.

A word or two now about enamelled cameo-vignettes. I was delighted to read the editorial remarks on the subject of this very charming style of picture in the article at page 192, for, according to my own taste, there is no style of *paper* portrait half so beautiful. The process of enamelling with collodion and gelatine, so clearly described in that article, is, no doubt, very good in skilful hands; but I have always been unfortunate in my own attempts to enamel prints by a similar process which is given in the last edition of the *Autotype Manual*, my failures consisting in the print not leaving the glass plate with an unbroken film. The process described in the *Autotype Manual* is as follows:—

"Coat a sheet of plate glass with plain collodion, as thin as possible—that is, so thin as not to give iridescent colours on the face of the print when finished. Allow this to become quite dry. Soak the print to be enamelled in the following solution, kept hot:—

Gelatine	1 ounce.
Hot water	20 ounces.
Chrome alum dissolved in one-third of the hot water	10 grains.

Lay the soaked print face downwards on the collodion surface, and with the india-rubber scraper remove the superfluous fluid, and place the plate and print in a rack to dry. When perfectly dry, the collodion, with the print firmly attached to it, may be readily removed, and will be found to have as perfect a polish on its face as that of the plate glass employed."

In a subsequent paragraph great importance is attached to the fact that the film of gelatine in the foregoing process is infinitely thin.

In my letter at page 202 I made a few remarks about the serum dry process of a Russian amateur, M. A. de Povorski-Jobavko; and at page 195 a translation of it by another member of our staff was published *in extenso* from the *Moniteur*. In the last number of that journal which reached me there is a second article from our Russian friend, in which he goes into raptures about this same process, when the plates are prepared with *bromised collodion alone*, on account of their extraordinary rapidity; and, in concluding, he describes himself as being "*dans un ravissement sans bornes*" (in a state of enchantment without limits) at the marvellous sensitiveness of his plates. In the same article he hopes that his remarks may meet the eye of Mr. Sutton, to whose communications in the *Moniteur* he is indebted for his first knowledge of the bromide process with the bath. He describes his experiments as having been made hitherto within a room, in the months of February and March, with the temperature at 14° Reaumur. I hope that his entire article will be translated, as his former one has been, and will find a place in the columns of this Journal. But, if our friend is so astonished at the sensitiveness of bromide *dry* plates organified with sour whey, what will be his state of mind when he tries *wet* bromide plates organified with alkaline gelatine?

I venture to predict that the time will come when the whole photographic fraternity will be as convinced as I now am myself of the marvellous sensitiveness of plates prepared by this simple and beautiful process; but to confess the truth I am not *personally* sorry at finding that for the last three years I have stood alone as its champion, because some day that fact, as a matter of history, may not be altogether to my discredit. By using a bromide only, with a strong bath, an alkaline organifier, and an alkaline developer, plates can be prepared which are TEN times as sensitive as the best plates by the common wet process developed with iron. Of this I am as certain as that I am now penning these lines; and, at the same time, when the *bath* is used and not the emulsion, this extraordinary sensitiveness is compatible with full printing density. But the organifier must not be acid; there must remain a trace of unconverted soluble bromide in the film, and the whole of the free nitrate must be washed out of it.

In the last letter which I received from Major Russell, he says:—"I tried alkaline albumen before I saw your notice of it. In my hands it was inferior to *alkaline gelatine, which I have found to be the best thing I have tried.*"

If a Russian amateur, experimenting with this process during the depth of winter in his ice-bound country, can become so enchanted with it, what may we not expect from others more favourably situated during the approaching summer season, since it has now been taken up with spirit by several continental amateurs! If we seek for the reason why professionals have not yet shown themselves much in earnest about it, we shall find it, I think, in the fact that they have already worked out a collodion process which answers their purpose tolerably well, and they do not care to embark in all the difficulties of a new one, however much better that may be. Whatever is new requires to be learned, and whatever has to be learned involves a good deal of experimenting and numerous failures. Nevertheless, a process may be quickly learned if it be properly taught—not by a verbal description, but by ocular demonstration in the studio; and I think that an intelligent teacher who is well up in the bromide process might make a capital thing by going about over the country and teaching it to the higher class of professionals. Take a good negative in two seconds, which would require twenty by the common wet process, and converts would be made of these gentlemen by hundreds. That such a feat is possible I am as certain as that I am now penning these lines. THOMAS SUTTON, B.A.

Stoak Vicarage, near Chester, April 29, 1874.

AN IMPROVEMENT IN THE CAMERA STAND.

To the EDITORS.

GENTLEMEN,—I wish to suggest to your readers a great improvement in the manner of fixing cameras to tripods. The ordinary method of placing the finely-polished base-board of the camera in contact with the tripod top is simply barbarous.

A thing of beauty is a joy for—well, in fact, so long as it lasts, and, in the case of a nicely-polished camera front, only so long as it remains in the maker's workshop or warehouse; for the very first time it is used the base-board is "slewed" round on the metal triangle, and a circle is scratched over the polished mahogany.

Now, there is a simple method of preventing this, and one that has many recommendations besides preserving the camera. It is to procure three india-rubber rings, such as are sold for children's teething rings, and stretch them over the corners of the triangle. They can be purchased at any india-rubber shop for a few pence; but if they cost as many shillings I feel certain that no photographer who has ever tried this simple addition to his apparatus would ever work without it.

Apropos of tripod tops: why should they be made of brass when malleable iron at a fourth of the price would answer the purpose equally well?—I am, yours, &c., GORDON RAMSAY.

34, *Argyle-square, W.C., May* 3, 1874.

INFRINGEMENT OF PATENTS.

To the EDITORS.

GENTLEMEN,—I very much regret to have to inform you that after all the trouble, labour, and expense I have had in bringing before the public my patent process, the results of which are generally admired by the profession, I find myself beset by individuals who attempt to rob me of my due, and send circulars to photographers setting forth that they will work their pictures by the Ferranti-Turner process. You may imagine that if such illegal practices were allowed to go unchecked there would be no safety for any one or any thing.

You will see that I have been obliged to send a "caution" to be published in your Journal, and I hope I may safely reckon on your good offices in denouncing the illegal attempts rather than countenance them in any way whatever. In expressing that hope I only appeal to your sense of justice and honour, and acquaint you with the doings of unscrupulous individuals.—I am, yours, &c., C. FERRANTI.

132, *Bold-street, Liverpool,*
May 4, 1874.

Miscellanea.

THE USES OF PHOTOGRAPHY IN ILLUSTRATED JOURNALS.—In our young weekly contemporary, the *Illustrated Sporting and Dramatic News*, photography appears to be thoroughly recognised as a means for securing accuracy. In the last number (that for May 2) there are no fewer than five leading engravings reproduced from photographs taken for the purpose, namely, the portrait of the horse *Rataplan* (a full-page engraving), the *Crack's Box at Tickhill*, portrait of the *Earl of Scarborough*, *View of Sandbeck* (the seat of the Earl of Scarborough), and *Miss Amy Fawsitt*—the last three being full-page engravings. With one exception these photographs were all obtained on dry plates prepared by Colonel Stuart Wortley.

A CHANCE FOR THE SPOONY.—An invention has been patented in Paris for photographing the beats of the heart. Mr. *Porcupine*, ever on the alert, has secured the agency in this country, and begs to announce that he is prepared to treat with parties for the sale of the new invention. Special attention is invited to the advantages it offers to lovers, who can thus ascertain with certainty and despatch the daily state of the "little flutterer." Arithmetical tables showing the standard pulsations for each stage of spooniness have been prepared, and will be given gratis to every purchaser. Prices on application. A reduction made on taking a quantity. N.B.—Don't all come at once. —*Liverpool Porcupine.*

THE AMERICAN PATENT LAWS.—It appears that a convention of photographers of the state of Connecticut was held some time since, and an association formed in connection with a movement of American photographers for mutually-beneficial purposes. *Anthony's Photographic Bulletin* says that a committee was appointed at the Connecticut convention to procure the best legal advice in the interest of the Association, and an adjournment took place till April. We *(Bulletin)* have not yet received the copy of the proceedings of the meeting. In an interview with Mr. Burwell, the treasurer, we were informed that suits had been brought against two of the photographers in New Haven, and that Ex-Governor Ingersoll had been engaged for the defence. In examining the report of the proceedings of the Brooklyn Association at their last monthly meeting, it will be found that steps for the formation of a protective association of a similar character were there taken, and a suggestion made that an association of the same kind be formed in each state, and that the proper officers convene, to consult upon general action from time to time, as necessity requires. We commend heartily the action and spirit thus exhibited, and hope they may result in perfect success. It may sometimes happen that a person may use a power conferred upon him to harrass and annoy others without giving an opportunity to have his claims and rights legally tested. In the case of a patent used in this way we are informed that persons suffering from what they may consider an imposition and a wrong have a right to petition the United States Court for a *repeal of the patent.* We were not aware of this fact until a few days ago, and were therefore under the impression that there was no remedy in such a case. If our information on this point is correct—and we believe it is, from the fact that the statement, first communicated by one of our most experienced patent agents, was confirmed by one of the most eminent patent lawyers in the country—the associations now being formed may have an opportunity of going to work without delay.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

William Child, Leeds.—*Four Portraits of H. R. Marsden, Esq., Mayor of Leeds.*

John Werge, Berners-street, London.—*Photographic triptich, entitled The Three R's; photograph of group, entitled Open your Mouth and Shut Your Eyes; photograph entitled The Dawn of Music.*

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

E. FONTES.—Received.

HARVEY, REYNOLDS AND CO.—In our next.

W. H. LISCHER.—We are giving the subject our best consideration, and will communicate with you in a few days.

T. W. H.—The process has been so thoroughly described in this Journal as to leave nothing more to be said in a pamphlet.

IGNORAMUS—A solution of bees'-wax in oil of turpentine, to which has been added a little oil of lavender, will, when applied with gentle friction, impart the desired brilliancy to the photographs.

A. H. W.—Before we can reply to your query it will be necessary to inform us in what manner the opal picture was made—whether by wet or dry collodion with development, or by collodio-chloride.

J. J. A.—In using the front lens alone have it so arranged as to present the convex side towards the transparency. You will require to place a diaphragm within two inches of the flat side of the lens if you wish to secure the best definition.

D. H. CUSSONS & CO. (Southport).—Mr. Sutton has forwarded your letter to us. We cannot take any notice of it in the body of this Journal for obvious reasons; but a very simple remedy for your grievance will be found by making use of our advertising columns.

V. F.—So far from nothing, during late years, having been published in the Journal on microscopic photography, the subject, in our estimation, has received more attention than any other of equal importance. Our ALMANACS, too, have for the last two or three years contained special articles on the subject in general and on the correction of object glasses in particular. We refer you, therefore, to these articles.

A. W. BEER.—1. There is no *dry* process the manipulation of which is such as you describe. The glycerine and honey process is, no doubt, that to which you allude, as in this the preservative is applied without a previous washing of the plate.—2. We advise you to begin with the tannin process. Infusions of coffee or tea answer in the same way as tannin.—3. The strong developer in our next.

W. B. P.—Probably, after all, the cards may contain some deleterious material; for there is nothing in such starch as you have been using to account for the untoward effects previously described. Test one of the cards for hyposulphite of soda, using the iodine test; also try and discover of what the enamelling consists. Our "candid opinion" of the *cartes* you enclose is that they are very excellent. You are evidently a master of the art of retouching. Thanks for the portrait of yourself.

ED. MILSOM (Lyons).—This correspondent, speaking of an apparatus similar to that used by Professor Piazzi Smyth for photographing the pyramids, says:—" Should you know of any amateurs using this apparatus I shall be obliged by your letting me know their names and addresses. There are many details of manipulation which would, I think, be improved by the interchange of ideas. I have tried Sutton's bromide process with this apparatus (of course no glycerine wanted, as the plate remains in a bath of distilled water), and I have obtained increased rapidity; but the images do not bear enlarging to the same extent as with the usual iodide of silver. Can you tell me whether this fact of bromide giving a coarser image than iodide is corroborated by other operators?"——This question is one which might easily be answered after a few experiments.

W. R.—The best form of adjusting camera stand at present in use is that introduced by Mr. Price, and described in this Journal about four years ago.

HERBERT B. BERKELEY.—Our correspondent writes:—" I believe that sulphocyanide of ammonium, to which a small quantity of ammonia has been added, has been recommended for fixing silver prints. I have been looking for the formula in the Journal, but have not found it. Can you refer me to it? and also inform me as to whether such a fixing bath would keep after using—that is, would it, after being used, give permanent prints? Is it subject to vagaries like the hypo. bath? Must it always be alkaline? And would there be a chance of sulphur being set free? In a word, is it likely to give more permanent prints than the hypo. bath?"——It was found that, while it was quite possible to fix prints with sulphocyanide of ammonium, much more care was required than in the case of hyposulphite of soda. When the directions supplied for using it were followed it was found that it would not remove all the sensitive salts from the paper, and hence for some time it was believed to be incapable of doing so; but Mr. M. Carey Lea demonstrated, in 1867, that by passing the prints through three successive baths they were thoroughly fixed. The main difference between the two fixing agents is that a silver salt is precipitated on diluting the sulphocyanide solution; but this does not occur when hyposulphite of soda is the solvent employed. The addition of chloride of ammonium to the sulphocyanide bath very much retards the precipitation. The best formula for a toning bath by this agent is the following:—

Sulphocyanide of ammonium .... 1 ounce.
Chloride of ammonium .... 1 drachm.
Water .... 4 ounces.

Allow the print to remain in this for fifteen minutes; then remove, rinse, and place in a second bath of the same composition as the first for the same length of time; then wash in the usual way for two hours. The other subjects spoken of by our correspondent will receive attention in our next.

RECEIVED.—J. W. Gough; B. W. Bentley; *Tyers' Block Telegraph and Electric Locking Signals* (fifth edition).

"TICKELL'S POLISH FOR PHOTOGRAPHERS."—Under this designation we have received from Mr. Joseph Tickell a specimen of a preparation he has introduced for cleaning glass plates, or even metallic surfaces. It consists of a fine, compressed powder, with the nature of which we are unacquainted, but which is free both from acids and alkalies. It certainly answers the intended purpose very well. The directions for use are as follow:—" Wet with water a soft rag, rub lightly on the polish, then rub the article to be cleaned, and polish off with clean chamois." This polish is advertised in our usual pages for such announcements.

PHOTOGRAPHIC SOCIETY OF LONDON.—A special general meeting of this Society will be held, immediately after the close of the next ordinary meeting, on Tuesday next, the 12th inst.:—1. To substitute for the third, fourth, and fifth paragraphs of Law VII., enacted at the special general meeting of February 10, 1874, the following—" If vacancies occur by death, resignation, or other cause in the office of President, Vice-Presidents, Treasurer, Secretary, or members of Council, individuals shall be elected at the annual general meeting, or at a special general meeting to be called for the purpose, to fill the vacant places, and shall serve the offices subject to the condition of retirement by seniority that would have applied to the persons whose seat they fill." —2. And, in the event of this alteration of the clauses being carried, to nominate a President, three Vice-Presidents, and eighteen members of Council, including a Treasurer and Secretary, to fill vacant places; such officers and members to be elected at another special general meeting, to be called at the earliest practicable date subsequently.—JOHN SPILLER, *Vice-President.*

LONDON GAZETTE, *May* 1, 1874.

SCOTCH SEQUESTRATION.

W. P. TRUEFITT, photographer, May 5, at 2, London Hotel, Edinburgh.

METEOROLOGICAL REPORT,

For the Week ending May 6, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
30	30·07	W.	42	47	—	38	Fine
May.							
1	30·01	NE	44	47	58	44	Fine
2	30·11	E	40	41	58	37	Cloudy
4	29·84	E	40	43	52	38	Cloudy
5	29·90	NE	41	45	52	41	Cloudy
6	29·87	WNW	43	49	56	43	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 732. Vol. XXI.—MAY 15, 1874.

THE LONDON PHOTOGRAPHIC SOCIETY IN DISORDER.

Sensational meetings seem to be the order of the day in connection with this Society. At every meeting held this year—whether ordinary, special, or general—some new and unexpected event has taken place; and at that held on Tuesday evening last the most startling event of the season occurred. It was the old squabble again—what should be the law, and who should be the rulers. But the end was the most remarkable—a refusal of anybody to rule, a casting to the winds of all rules, and the unconstitutional adoption of a precedent which must be fatal to all societies following such a course.

The meeting, which was scantily attended, commenced quietly enough with the reading and discussing of three papers of more or less interest. It was then declared "special" to discuss a minor alteration of one of its laws, of which due legal notice had been given, so as to permit the nomination of members to fill the vacant offices created by resignations. The proposed alteration, after some discussion, was adopted, and, instead of following it up, as in consistency should have been done, one member proposed a motion, of which the rest of the members had received no notice whatever, that, instead of nominating persons to fill the vacant offices and at a subsequent meeting electing those considered the most eligible, a *plebiscite* should at once be adopted. On this motion a heated discussion arose, and after a vain attempt to discover what the clumsily-worded resolution was in which the *plebiscite* was involved, the members by a majority declared it should be adopted. No sooner was it passed than a difficulty arose as to what it really meant, and how it could be worked out. A committee was therefore appointed to "lick it into shape," and what further will come of it time alone can reveal.

Of one thing our readers may rest assured—that a more daring disregard of the laws of the Society and of the rights of the absent members was never before perpetrated. It has been aptly said that at the preceding meeting, in a fit of ill-temper and arrogance, the ex-President "lost his head." On this occasion, in a fit of wild licence, the few members assembled lost *their* heads, and, in disregard of all law, a plan was accepted that is as foreign in name as it is to our English habits. A more absurd proceeding, to say nothing of its illegality, was never adopted than to coolly accept at one period of the evening a legal means of escaping from difficulties and at a later period to ignore it altogether, and to rush to lawless extremes. It would not have been so bad had the members generally been informed of what was meditated. But to call a meeting for a legal purpose, and under its cover to arrive at quite another and an illegal decision, seems not only the height of unfairness, but a complete abuse of the right of public meeting. The absentees are clearly exonerated from this act, and we shall not be surprised if at a future time they reverse it, and show that, in their desire for reform and liberty, they also have a regard for law and order.

That it was a "cunningly-devised trick" is evident. We have said no word yet as to whether the plan is an advisable one or not. We have confined ourselves to exposing its utter irregularity and unfairness. It was a trap prepared to catch some of the "reformers" who had a craving that the majority and not the minority should rule, and into which they would be likely to fall. Some of them caught at the bait and fell into the trap. Are they prepared for the consequences of such a proceeding? Will they permit the precedent to be established that a meeting called for a legal purpose should be so diverted as to promote an illegal object, and that something of which they have had no notice, and which is hostile to the laws, is to be made binding upon them by a majority—possibly a packed majority—at such a meeting?

We have nothing to say against a *plebiscitum* in the abstract. There may arise circumstances—and the present crisis may be one—when a universal appeal to the members might be desirable; but there is nothing to prevent this being done in accordance with law and order. In the present instance had the members received proper notice that at this special meeting it would be proposed that the ordinary laws relating to the election of the officers should be suspended, or even repealed, and that an appeal should be made to the members at large to nominate and elect by the same action—the majority of votes prevailing—such a proceeding, though unusual, would be reasonable and legal. Had all the members received such a notice those who were absent would legally be bound by the act of those present, and all would be fair and according to usage. If with such information the meeting had decided so to act all would have been legal and no objection could be taken to the proceeding. How far such a deviation from ordinary custom is desirable is fair matter for argument. Even supposing that such a proceeding is the only way of getting out of a difficulty, it is no justification for adopting it hastily and with unfairness.

We have our private opinion as to which is the better of two methods—the one to propose by individuals competent to judge the names of various members thought best fitted to fill the vacant offices, and who if elected would be likely to act; or to send papers broadcast for every member, whether conversant or not with the judgment and intelligence of each person comprising the general body, to name whom he please, without the requisite knowledge as to whether the member so proposed will serve or not.

Much useless talking and writing have been expended on *legal* elections, but if this *plebiscite* be persisted in, the business transacted by persons so selected can have no claim whatever to the slightest validity. But we have no desire to anticipate what may be the consequences of this "rough-and-tumble," haphazard, and illegal mode of election if it be persevered in. Even should it come out well it is a dangerous principle to rely upon—that a good end may be achieved by unjustifiable means.

The only redeeming element we perceive in this daring matter is that the right of the majority to rule is unequivocally conceded. This was the work the reformers in the Society set themselves to accomplish, and the measure of their success is overwhelming. The ex-President, in attempting to resume office at the last meeting, put this plain issue before the members—Would they allow him and his colleagues to return to office on the principle that the selected minority should rule and dictate. The clear answer was that the majority must prevail. On this decided answer he took his deserved dismissal, and if he ever return it will be as "a sadder and a wiser man." Our only regret is that any of the reformers should have degenerated into lawless licence. All desirable good can be accomplished by perseverance and by means honourable and constitutional.

ON A REACTION OBSERVED IN DEVELOPING IRON PRINTS.

The following observation is worthy of being placed on record, because the difficulty now detailed may form a stumbling-block to many an aspirant to fame.

We lately saw some old ferrotype or, as they have been sometimes called, cyanotype pictures which would rival the best silver prints as regards clearness of the whites and the modelling effects. These pictures always possess a considerable amount of interest for the experimental photographer, and he keeps hovering round them like a moth round a candle. What a glorious thing if the photography of the future should dispense with such dirty and expensive salts as nitrate of silver! And, besides, it represents the original process of Sir John Herschel.

The first experiments, it must be remembered, were conducted with perchloride of iron, which, if exposed to light in conjunction with organic matter, is reduced to protosalt. The picture is developed with ferricyanide of potassium, which strikes a blue colour with the protosalts but not with the persalts. The ammonio-tartrates and citrates and the ammonio-oxalates have all been employed with some advantage for this purpose; but the reaction with the last being more energetic it may be said to have superseded the others.

Therefore, the picture consists of a very decided deposition of ferricyanide of iron—a variety of Prussian blue which is generally known by the name of "Turnbull's" blue, and having the following complicated construction:—

$$\dot{F}e_3\ Fe_2\ Cy_6,$$

ordinary Prussian blue being the ferrocyanide of iron.

We have seen prints produced by this process in which the pureness of the whites were only equalled by the intensity of the deep shadows, the Turnbull's blue being in such shadows actually deposited in flakes of pigment.

But, unfortunately, the numerous iron salts of cyanogen give modifications which are more or less soluble; thus, we have a soluble Prussian blue. If, for instance, we wish to make soluble Prussian blue, we precipitate a persalt of iron with ferrocyanide of iron it remains insoluble as long as it is imperfectly washed, but no longer; on the addition of ferrocyanide of potassium to ferric chloride a blue precipitate falls and is washed until it begins to dissolve. This does not take place until the chloride of potassium is washed out, after which it is perfectly soluble in pure water.

A somewhat similar reaction seems to take place in washing the prints obtained with Turnbull's blue. If the pure ammonio-ferric oxalate be used, on washing the deep shadows immediately begin to float away, to the manipulator's great disgust. The presence of any mineral salt, however, seems to prevent this to a great extent.

Thus when the paper is floated upon a solution of ammonio-ferric oxalate, and afterwards developed with ferricyanide of potassium, a print is obtained which, if the pure oxalate have been used, will almost instantly wash away. If, however, a salt be used containing an excess of oxalate of ammonium we almost avoid the phenomenon, and with a little care in manipulation the print may be successfully washed. We have no doubt that the judicious use of a weak solution of chloride of sodium would eliminate every difficulty in this respect, the quantity necessary to turn the scale as regards the solubility or insolubility of these blues being infinitesimally small. One of the difficulties of this process consists in keeping the articles perfect.

WHAT COLOUR IS BEST FOR PHOTOGRAPHS?

Have photographers in general anything like a clear idea of the immense importance of the profession in which they are engaged as one of the industries of the country? We hardly think so, and commend to their attention some observations made by Mr. W. Neilson, in a paper read at the last meeting of the Edinburgh Ph tographic Society and given in another page, which are at le suggestive.

Amongst the numerous materials required in the varied proces and manipulations for the production of a finished print albu can only be considered as a small item. We are satisfied, howe that Mr. Neilson has much understated the number of eggs actua consumed; but yet a million eggs, at the modest estimate of ni pence per dozen, amounts to no less a sum than three thousand o hundred and twenty-five pounds sterling. If such an amount annually spent on one small item, what shall we say of the necess pecuniary outlay on silver, gold, glass, ether, alcohol, gums, pa and all the thousand-and-one articles either directly or indirectly daily use by the professors of our art? On this matter we must the present leave each reader to speculate for himself, although intend to look somewhat closely into the subject, and shall probab by-and-by, publish a column of statistics which will be startling those who have hitherto entertained a superficial idea of pho graphy as a commercial interest.

Meanwhile, taking the immense importance of photography as industrial institution for granted, we would ask—Are photograph doing their best, and doing it in the right direction, to maintain a increase or develope that industry? The general reply will no do be—"Of course, photographers know their own interests and th own business best, and are likely to do that which will most rapi increase on the right side the balance in their bank account." Th no doubt, sounds well, and in ordinary business or trade transactio the reasoning would be faultless; but in connection with professio depending for support on taste and the appreciation of the beautif matters of culture, training, and education, we think it is somewh different. In ordinary trade the supply is mainly regulated by t demand, while, in the other case, the demand is mainly created the supply. We know that there are many professional pho graphers who have made the "pot boil," and boil well, with higher aim than to produce that which their *clientèle* require; b we hold that with such a limited goal in view no real advanceme can be made, and retrogression is inevitable. We believe that who would not not only maintain his present position, and advan not only himself but his interests and the art generally, can on do so by gradual but constant progress upwards and onwar always raising his *clientèle* up to his own level, and teaching the how to appreciate in a higher degree that which is nobler and mo beautiful in art.

If photographers generally followed this course real progre would be rapid. There might, at first, be some little hitches. touchy or self-opinionated visitor might decline to be tutored into t knowledge of better things; but for one so lost we have no doubt t would be gained. Expansive as photographic industry now is would become largely extended, and the photographer would reap double reward—an increase in his emoluments and a larger feeli of that conscious self-respect which ever follows the true dischar of duty.

The old masters whose names are yet household words did n make reputation and fortune by painting according to the then pr vailing taste, but strove to reach to their highest possible conceptio of art, thereby elevating their contemporaries. The great manufa turers of ceramic ware were not content with the rude form an coarse ornamentation of the articles which pleased their purchaser sufficiently well, but called in the aid of the designer both for for and ornament, and by the improvements so made increased th demand a thousandfold. So should it be with the photographe Let his aim be high, his determination to reach it irresistible, and h may depend on a public ready to appreciate and reward his efforts.

As an illustration, let us consider a case in which the photographer very frequently gives way to popular taste rather than be guided by his own judgment. It is as to the colour of his prints. In passing along any of the fashionable thoroughfares of the metropolis we now and then encounter a specimen case of prints of the cold blue-black shade, frequently praised as being "so like an engraving," but which to most people is really disagreeable. We have frequently questioned such photographers as to their preference for this colour, and always got the same answer. They did not themselves like it—in fact, considered it a mistake—but it pleased their customers, and that was the grand thing to be considered. Mr. Bruce, of Dunse, in his otherwise excellent paper, published at page 196 of our number for April 24, boldly expresses his preference for this colour, and labours to justify his choice, but, we think, without success.

Photography and engraving seek to render depth and transparency by very different means; and what may be very suitable in the one case is, we think, unsuitable in the other. Whatever the black ink may do in the engraving, it certainly does not give the desired depth and transparency in the photograph; and this, we believe, will be the opinion of every unbiassed artist or man of taste who has suitable specimens submitted to his judgment.

It is, perhaps, easier to say what is unsuitable than to point out what is suitable. We feel persuaded, however, that a large majority of those whose opinions are entitled to most weight would decide in favour of a warm purple-brown, but with the purple in very minute quantity. At present we do not care so much to decide on what the colour should be—although we certainly prefer the warm tones—as to impress upon photographers the necessity of first thoroughly satisfying themselves as to what is best, and then teaching the public to think so too. If that were generally done we have no doubt that black, or attempts at black, tones would soon disappear. The less artistically educated of the public who demand black tones do so, we believe, from a feeling that because engravings are generally in black the photograph should be so also; but they ought to be aware that some of the most valuable of the old masters' works were printed in warm colours. The *Libri Veritatis* of Claude Lorraine were all in a warm brown; the splendid engravings of Bartolozzi were printed in red chalk; while the works of many others not so well known, but still excellent, were in similar colours.

We would advise those who have any doubt of the greater transparency, depth, and brilliancy of warm colours to examine carefully some of the work of the Autotype Company or other carbon printers, and it will be found that where black has been used there is dulness and flatness; but where the purple-brown—such as is found in the print in our ALMANAC of this year—has been introduced the result is simply admirable. Photographers should imitate that, and teach their patrons to like it, and if photographic artists do not succeed, the result will not be due to the colour of their prints.

FADING.

IN another page will be found reported a somewhat singular case which was tried at the Westminster County Court on Monday last. A gentleman entrusted to a bookbinder some photographs to be mounted and bound up in a volume. As some of the photographs were observed, soon after the book was sent home, to have become faded the owner not only declined to pay the bookbinder his charges, but entered an action against him on the alleged ground of his having damaged the pictures. That the pictures had really faded no one for a moment disputed; the only question was as to who was the culpable party. The defendant alleged that the fading arose from improper paste or other deleterious material having been used in their mounting; the plaintiff, on the contrary, asserted that not only had he used every precaution which could be taken with photographs, by using freshly-prepared starch of the finest quality, but that several of the prints displayed well-marked symptoms of fading before they came into his hands. The case, as will be seen, was eventually decided in favour of the plaintiff.

Now there are some points of interest suggested by this case. Assuming—which was not the case in this instance—that a bookbinder to whom is entrusted photographs for mounting uses ordinary flour paste containing alum, can he legally be held responsible for any resulting damage to the photographs from the presence of the alum? or would responsibility exist even if he used sour paste? Bookbinders are not necessarily aware that silver-printed photographs are so delicate as to succumb to innumerable things small in themselves but fatal to a photograph. Unless specially forewarned why should they be expected to know that even the antichlor so commonly present in mounting-boards is one of the direst foes to photographs, while the chlorine which it is the function of the antichlor to eliminate also causes swift destruction? But if, in addition to the chances of either chlorine or antichlor (this latter substance, we need scarcely observe, is hyposulphite of soda) being left in the mounting-board, there are also traces of hyposulphite left in the print, then the probability of speedy fading is greatly increased; and to enter an action against a bookbinder on account of such fading is both unwise and unjust.

We understand that previous to mounting the pictures in the album they were immersed for a short time in lukewarm water, for the purpose of removing them from the cards on which they had been mounted when purchased. A question here arises — What effect would warm water have upon a print which had already begun to fade, although the fading be in such an incipient stage as to be scarcely appreciable? Chemical action, says a well-known axiom, is assisted by heat; and we are only too well aware that the progress of fading is rapidly accelerated by moisture. If, on the other hand, there was a chance of the element, whatever it might be, which led to the fading being removed by the solvent action of the warm water, then this treatment should have enhanced its permanence rather than hastened its decay.

Troubles, however, oftentimes prove blessings in disguise; and a trouble of a character somewhat similar to that just recorded became the means by which Mr. Fox Talbot was first induced to seek, in carbonaceous printers' ink, relief from the fugitiveness he discovered to be inherent in silver prints; for, as our readers have already been informed, when he found that so slight a thing as sour alum paste caused the prints in his *Pencil of Nature* to fade all round the margins—by which only, and very unfortunately, they had been attached to the board—he lost confidence in their stability, and immediately devoted his energies to the discovery of something which should be more durable, and which resulted in his beautiful photoglyphic engraving process, which has since served as a basis for innumerable ramifications and improvements.

THE USE OF PARAFFINE IN THE PRODUCTION OF TRANSPARENCIES.

WE have tried some experiments upon the use of paraffine, and the results in some cases have been bad, whilst in others they are quite up to the desired mark. It will, no doubt, be remembered that in a previous article we pointed out the remarkable chemical neutrality which this substance exhibits; and it is this chemical neutrality which particularly points to it as a desirable adjunct in our art. Thus, to take up the subject of transparencies, we know that many of the substances used to saturate the fibres of the paper pulp—and thus, by rendering it homogeneous, conferring transparency—possess such an affinity for the atmospheric oxygen that a yellow tint developes itself by age. All the drying oils, and many varnishes, possess this objectionable peculiarity in a marked manner. In our experiments with paraffine applied to processes—such as the waxed-paper process—no particular success was achieved; but in the production of transparencies it was perfectly successful. In connection with collodion it is not workable, because the solubility in ether produces reticulation.

In our last article upon this subject we mentioned that there were two qualities of paraffine—one very hard and crystalline, more resembling stearine or spermaceti in its nature; and the other a soft variety, obtained by the action of heat, and which is, to a considerable extent, plastic. It varies in its nature from a hard consistency like wax to a plastic condition that may be moulded, to an extent, between the fingers. It is the latter description we should prefer. It may be used directly in mounting an ordinary print upon glass—in such case, however, employing a little heat. We are of opinion that the use of any varnish upon this should be avoided. The well-known uncertainty of all oils and most varnishes in becoming coloured by light is too serious a venture to warrant us in employing them.

A laundress's ordinary flat iron is, perhaps, the most convenient thing that can be made available for mounting the print upon the glass—using a piece of bibulous paper between the iron and the print to absorb the superfluous paraffine. Such a mounting may be very usefully employed for securing the soft effect produced by placing a second picture behind the transparency.

In this method of manipulating it will be necessary to melt the paraffine, and perhaps the following mixture may be utilised with advantage, as it is fluid at ordinary temperatures, or, if not so, the warmth of the hand will render it liquid. The small quantity of Canadian balsam is introduced for the purpose of making the print more adhesive to the glass; but we really have grave doubts as to its proving of any great advantage in practice, because even this substance is, to a certain extent, amenable to the action of the light and oxygen:—

Paraffine	2 drachms.
Benzolé	5 fluid drachms.
Canadian balsam	Half a fluid drachm.

The paraffine should be melted, removed some distance from the light, and four fluid drachms of the benzole added during agitation. The Canadian balsam is to be dissolved in the other drachm of benzole, and the whole is then to be mixed together. Paraffine and Canadian balsam do not mix very well; but with the interposition of the menstruum, benzole, they seem to blend perfectly.

The advantages of such a mixture as the above are that it can be applied cold with a brush, and that it dries perfectly in a very short time if the benzole be of good quality. To perfect the adhesion, however, we would recommend that the warm iron should be passed over the surface after it is quite dry. Such an operation also ensures the volatilisation of any traces of the benzole that might remain. The same solution might, perhaps, be used with advantage to preserve prints from atmospheric influence.

WITHIN the past few weeks an ingenious and really valuable application of what has long been known as the "dusting-on" process, for producing positives more especially intended for photo-enamelling, has been receiving so much attention as to render it certain that at no distant period it will become extensively practised throughout this country. The process, we may observe, is one for the reproduction of negatives, and its application to this purpose is associated with the name of Herr Obernetter, of Munich. We have already published his method for effecting such reproduction, and further particulars will be found in the present number. The subject was brought forward at the meeting of the London Photographic Society on Tuesday evening last, and several negatives thus reproduced were passed round for inspection by the members. Among these were some by Mr. Woodbury, which we had an opportunity of examining with some degree of care prior to the meeting. The material of which the image was formed was a fine specimen of graphite, which, as most of our readers know, is also known by the more familiar terms of "plumbago" or "blacklead." We examined these negatives by Mr. Woodbury under a microscope, and were surprised to find the atoms so very fine. All the most delicate items of detail in the original were also reproduced in the copied duplicates. We have been making experiments in this direction, and shall have more to say upon it next week.

RELATIONS OF COLOUR TO SENSITIVENESS.

THERE appeared lately in your contemporary, the *News*, a letter from Dr. Hermann Vogel on the subject of some investigations that I sent you on the effect of the contact of coloured bodies in influencing the sensitiveness of silver bromide to particular rays.

It is an error to speak of these investigations as a repetition and continuation of his own. They were essentially different, though they had for their object to ascertain whether a generalisation and confirmation of Dr. Vogel's views could be obtained, and whether any general law existed connecting the colour of a body placed in contact with silver bromide with a change of sensitiveness of the bromide to any particular ray. I was forced to conclude that it did not—in this coming to a conclusion different from that of Dr. Vogel. That photo-chemist objects to my tests that no artificial colours exactly resemble the colours of the spectrum. I need scarcely say that this fact was fully recognised and taken into consideration before making the experiments which I sent you, and had my object been the determination of the absolute, instead of the relative, effect of colours I should certainly have employed different means.

But it is certain that a piece of glass stained or coloured so as to transmit almost exclusively rays of a particular colour will exercise predominantly the function of that colour, although a few rays of a different refrangibility may accompany them. So that if silver bromide, either pure or with colour admixed, is affected in a particular way under this glass the effect may with propriety be ascribed principally to the predominant colour, and this is sufficient to vindicate my methods of observation. Moreover, in a very considerable number of cases any possible objection of the kind was obviated by the use of the same pigment to colour the glass as to mix with the silver bromide.

In favour of the use of glass for the purpose in question—that of qualifying the light which is to act on the silver bromide film—I may cite Dr. Vogel himself, who in this very investigation has used it for the same purpose and essentially in the same manner which he objects to in my case. I refer to the experiment described by him in his original paper at page 1305 of the *Berichte* of the German Chemical Society (November, 1873), where, to test the sensitiveness of a silver bromide, a certain combination of colours was photographed *with the interposition of a piece of yellow glass*, "which absorbed the blue light, but allowed the yellow to pass through unweakened." I may observe that this last statement is not quite correct. No yellow-coloured glass allows yellow rays to pass through unweakened; and, further, the use of coloured glass, which was legitimate in my experiment, was scarcely so in that of Dr. Vogel. His photograph of the colours would have been more decisive if made without the interposition of the glass. His use of the glass, however, indicates a conviction of its efficacy to stop certain rays and transmit others.

I was greatly interested in Dr. Vogel's experiment, and in undertaking my own I was very far from desiring to confute his. On the contrary, I expected to find a confirmation of his views and a generalisation of the principles resulting from them. I was disappointed in this, and cannot help thinking that his theory is erroneous. He holds that, when a substance itself capable of combining with bromide is placed in contact with silver bromide, the sensitiveness of the bromide is increased to those rays which the coloured substance absorbs; thus, that a substance transmitting pure green light and absorbing red increases the sensitiveness of silver bromide to the red rays. With all due consideration for Dr. Vogel's interesting researches I have, after a rather extended examination, been able to find no confirmation of this law; no definite relation between the sensitiveness imparted as respects particular rays and the colour characteristic of the substance added; and, further, what I cannot but consider very curious, that the substance which most completely modified the sensitiveness of silver bromide to particular coloured rays was itself altogether colourless.

M. CAREY LEA.

HOW TO REPRODUCE A NEGATIVE.

HERR OBERNETTER, whose experience in enamelling we gave a week or two ago, continues his observations on the use of powder development, and devotes, in a recent number of the *Correspondenz*, a short article to describing his method of reproducing negatives "so as to leave no perceptible difference between the copies and the original." The mode by which he does this has already been particularised, but the details of his experiments and process are in many ways interesting.

At first Herr Obernetter worked with the old method—copied with the camera or by dry plates—and getting thereby good positives, but from which again he could not get perfect negatives. They were either flat or hard, so that he never got results which contented him. Collodio-chloride did better, and he has obtained negatives by it which gave nearly as good prints as the original, but it was at the cost of a terrible expenditure of time and labour; and as to how long he worked before he got a good copy the least said the better *(darüber will ich schweigen)*.

When the war of 1870 gave time for experimenting, the idea laid hold of Herr Obernetter to reach his goal by means of dusting on, and next year he was able to declare the attempt a success. He was able to accomplish a great deal of work by this method alone. At that time he used silver precipitated with protosulphate of iron, as already described. The actual practice of the method has simplified its details and proved it to be an excellent one. In the ordinary course of business he has produced within the last three years duplicates of over two thousand negatives, all of which are retained in his possession, and the largest of them has a diameter of twenty-eight inches.

Looking on these negatives with the naked eye, even an experienced photographer would not be able to tell the difference between the original and its copy, while the paper prints from both are alike. More than that: from a negative which takes a day or two to print from, so dense is it, it is quite possible to get another which will give as good a print in an ordinary length of time, or from a too flat negative a bolder copy may be obtained, and from any negative a copy suitable for enlarging purposes is easily produced.

The method is not complicated, and there are no difficulties as to the chemicals used. What is needed is expertness; and that anyone can gain, be he photographer or not. Here is the full procedure:—

A new, carefully-polished plate glass is coated with the following solution, precisely as it might be by collodion:—

Dextrine	1 drachm.
Common white sugar	1 „ 15 grains.
Bichromate of ammonia	½ „
Water	25 drachms.
Glycerine	2 to 8 drops.

After complete solution filter through paper. The mixture will keep for several days.

The plate thus coated—from which the superfluous fluid has been drained at the corner—is then placed in a dust-free drying oven, in a horizontal position, the temperature being from about 120° to 170° F. In from five to ten minutes' time the plate will be dry. While still warm it should be exposed in an ordinary printing-frame under the negative, and in diffused light, according to the intensity of which the print should be done in from five to fifteen minutes. The exposure is right when the image is faintly visible on the plate.

After exposure the plate is again placed in the drying stove till it is slightly warmer than the air of the workroom where the next operation is to take place. When so warmed it is taken, in not too bright a light, and laid on a sheet of white glazed paper. Take now a fine badger or dust brush, dip it in some very finely-pulverised graphite, and rub it with great care all over the plate. The biting of the graphite on the films may be accelerated by breathing on it gently. When the wished-for density is obtained all the superfluous graphite is cleared away, and the plate is coated with raw collodion made thus:—

Alcohol	500 parts.
Ether	500 „
Cotton	15 to 20 „

After the collodion has been put on, cut round the edge of the film with a sharp knife and lay the plate in ordinary water. After a few minutes the whole film will be found to have loosened itself from the glass, and it may be turned under water and brought up with the plate, after which, washing it for a little under a tap will suffice to flatten it out and remove bubbles. A thin solution of gum—about two per cent.—should now be poured over it, and then the plate may be set up on end to dry spontaneously. When dry it may be varnished in the ordinary way.

Herr Obernetter has nothing to say upon the theory of this process. The facts are so, and that is enough for him; but there are several remarks, by the way, which he thinks it well to offer. The addition of glycerine, for instance, is used by him in order to correct, if possible, the variable character of the moisture in the atmosphere. In summer, when the weather is warm and moist, for example, good enough results may be got without any glycerine at all; while in winter, on the other hand, when the air is cold and dry, an addition of eight drops per 100 grammes of solution—for mixing, in fact—is requisite. One easily acquires the knowledge of how to regulate this element by practice.

The right sort of graphite is another matter of high importance. It is possible, indeed, to get passable plates with any sort or with the ordinary kind; but there is one in particular which gives negatives indistinguishable from the originals. This is the genuine sybarite, made by Faber, of Stein, near Nürnberg, and costing twelve shillings a pound. The impression is easily taken, the margin being considerable, and any error easily helped when applying the powder. Too short exposure gives weak, and too long hard, pictures.

Lately Herr Obernetter had sent him from Berlin some valuable negatives which had been taken on very crooked glass. In copying these he could not get sharp pictures; for he dared not press the plates closely for fear of snapping the original plate. To remedy this defect he used mica plates, and transferred the film afterwards to a glass plate. The mica fitted itself to the inequalities of the negative, and allowed a perfect copy to be taken without risk of smashing it.

Herr Obernetter promises a further series of practical hints at no distant date; but there is enough here to enable anyone to make a good trial of the process, and it is one which we feel sure will commend itself to not a few of our readers.

LANDSCAPE PHOTOGRAPHY: ITS PLEASURE AND PROFIT.

[A communication to the Edinburgh Photographic Society.]

I have been requested to read a paper connected with landscape photography as suited to the present season, when we are about to make arrangements for outdoor meetings. The design is merely to make a few general remarks, with the idea of calling up some foretaste of the pleasure and advantage to be derived from such meetings, in the hope of inciting our amateurs especially to bring us proofs that they are successfully prosecuting that work which particularly belongs to them, and in which they have already shown so much excellence. I do so trusting that the members will supplement what I say with practical suggestions, knowing that many of them are better qualified for that than I am.

As introductory, I shall make some remarks on the position of photography. It sounds something like a truism to say nowadays that photography is a great fact; but it may be doubted whether the import of the fact has been duly realised by the general community. The word "photography" is apt merely to suggest the results of certain processes which fill albums and portfolios with transcripts of every variety of face and place on which the sun deigns to shine. When we consider that almost every civilised being has at least one such album—or, at anyrate, that there are as many albums as civilised beings in circulation—the idea is indeed stupendous, indicating, as it does, a universal process that may almost be said to have covered the world with pictures. But the word "photography" is suggestive of much more than the pleasure to be derived from albums and portfolios, which are in themselves vouchers of an immense producing agency. In short, photography, by creating a trade of anything but despicable proportions, has become a partner in the commercial world, adding something to those international bonds that draw mankind together.

A complete view of the subject would be interesting in many ways. But at present just consider, in passing, the thousands of operators it has called into being (I do not call them artists, for they are not necessarily so, although we have names among us that would stand second to none in any school of the day)—the thousands of assistants, the thousands of printers, the thousands of spotters and retouchers, the thousands employed in producing paper, the thousands employed in providing chemicals, and the thousands who retail them, to which may be added the benefits incidental to Her Majesty's post-office and a variety of water companies, and even to descend to an albumen point of view, the encouragement given to the breeding of hens—I say when you consider the sum of all these varied and extensive results of the art we practise the import of the word "photography" is vastly increased.

Then, apart from its special art and the trade it has originated, its services to science are becoming noticeable. We have already seen the astronomer call in its aid to help him in solving his difficulty of the solar eclipse; and again he is about to rely greatly on it in dealing with the transit of Venus. Important as these services are in themselves they may be received as intimations of possibly greater services yet to be rendered in the unknown future. But whilst photography reaches sun, moon, and stars as a servitor of science, it is also a mighty servitor of our common humanity.

I presume we have all felt in reading a memoir, or perusing a volume of travels, that the interest is intensified by having a likeness of the individual or exact illustrations of the scenes described. In fact, a memoir without a likeness, unless written by a very able hand, is apt to give merely some prominent incidents and sectional views which do not convey a completeness of character. But add a likeness and it serves as an index to the man, the vague and fragmentary take shape, and we arrive at a truer interpretation of his character. This illustrating of books is a wide and useful field in which photography promises to play a conspicuous part, for I believe most people would prefer a photographic likeness in a memoir to any other; of course I mean a good photograph that has not been beautified, let us say, with retouching. In connection with this style of illustrating the public are indebted to photography for the likenesses it has scattered over the land of the great and good men of the day. However we may admire the heroic characters and standard-bearers of the day, we feel as if we knew them better when we have their likenesses in our albums. Through his countenance we read the man, enter into his character, and are more drawn towards him with that touch that "makes the whole world kin."

Is it too much to say that the national patriotism is enhanced by having the likenesses of the Royal Family—who represent our national greatness—made so familiar to us? I think not. It is not always the most powerful influence of which we are most conscious, and our characters may be moulded by an unrecognised agency. Suppose a man has a picture gallery filled with bestial countenances and loathsome expressions—will he, by habitually looking at them, feel himself elevated and refined? But it would be very different if the heads were expressive of all that is noble and good. Whilst consciously admiring them he would, however unconsciously, become influenced by the qualities they expressed. The noble thing, through his admiration, would leave a mark on him. This is a chief principle by which art becomes a benefactor of society. I have stated it thus to illustrate what I mean by saying that photography, by issuing broadcast likenesses of the good and great, confers a blessing on the country.

Then there is what may be called a moral aspect of photography, in so far as it helps to perpetuate the home influences by presenting the home faces. When one's memory for words is defective he has recourse to a memorandum book. In like manner the album serves the defective memory for faces, If we could remember our friends' faces as distinctly as when they are present there would be little recourse to the photographic memorandum book, except as to a curiosity. As it is, the *carte* album has its mission. Let us take one case, out of thousands of such, as a sample. When a young man goes (say) to India, "out of sight" is very much apt to become "out of mind." He finds himself in a new position, among new acquaintances, which open up temptations to extravagance and dissipation, and forgetfulness of the wholesome restraints of the old home. In such circumstances what an advantage it would be for him every night to open his album and look on his mother's face and the rest of the family, and the scenes of his earlier days! His household gods would still be with him, restraining him with the old home influences. And, take note, there is one pretty *carte* which he looks and looks at, and actually kisses, at the risk of inducing a yellow stain. Well, what a wretched being he would be without that piece of pasteboard! In conclusion of the subject: just think of the good all these albums confer on millions of people! Not a *carte* among them but calls up a happy smile on some face and a blessed throb in some heart.

These results of photography to which I have alluded are interesting from their variety, and imposing from their magnitude; but to the photographer they should be something more, for he can think of them as the great work in which he also is engaged. A man's character is partly moulded by the nature of his work, or, at least, by the ideas he has regarding it—"like the dyer's hand subdued to what it works in;" and if the photographer, instead of looking upon himself as a unit whose function is to develope plates at so much per head, could habitually think of himself as a component part of the great whole that is producing such important results on the world, he would induce a habit of higher self-respect that might tend to make him both a better photographer and a better man.

We now come to consider the last branch of the subject—outdoor work; of which I am here bound to say, "last not least," although I am going to commend it on no higher principle than that on which we turn horses out to grass.

Nature, always abundantly provident for the needs of man, has provided two things in especial abundance, which is equivalent to an intimation that these are especially required—cold water and fresh air. It is to be hoped photographers have enough of one of these in the dark room, though it is greatly to be feared they have a plentiful lack of the other; consequently they must seek it elsewhere. There is another ample provision of nature, from which mankind has taken a hint—the earth, which, in order to be properly productive, requires at times to be fallowed. Men whose brains are much employed, and some of whom that cannot be said, have wisely taken this as a precedent periodically to quit their habitual work and let themselves lie fallow. They accomplish this in varied ways—chiefly by fishing and shooting. Fishing is, no doubt, a delightful employment for those who like it; but, even if one use the fly—getting quit of the difficulty of putting the worm tenderly on the hook, "as if you loved it," according to old Isaac—he is very much tied down to one low-lying locality. Following the grouse on the hills is certainly an airy and healthy employment for those who require that sort of excitement. But there is something more excellent than rod or gun—the camera; with that on our shoulder we can face the smile of Mother Nature, feeling that we have no mark of blood upon us.

Let us now—to use a figure strong enough for Hudibras himself—try to have a sniff of the hill air through the nostrils of imagination. We have left the town behind us, with its oppression of smoke and stone and lime; and exult in the fond belief that Nature is waiting expressly for us to take her likeness. We have reached the rural inn, where we intend to lodge for some days. Delightful! a sanded floor; pictures of the four seasons that remind one of the primitive times of Noah and his wife; and everything so nice and clean—all intimating that "life should be spent in calm content." Thankful to be beyond the reach of gas we march to bed with honest candles in our hands, led by an old lady who looks like the remnant of an innocent world, the healthy Hebe being left behind to clean our boots. Now we are seated at our first breakfast, with appetites that seem to increase as the viands vanish—six souls in all, as merry as ever was "Old King Cole" himself. I propose that we should devote the day to "prospecting;" but am immediately "put down" with a hubbub of exclamations—"We may not have such another glorious day!" "We must have a trial of our plates to see how they work!" &c., &c. And when a bold man, who is "going in" for "the wet," declares that his tent is dying to stretch its legs it is evident that we are all eager to perform a like operation on ourselves. Having agreed to reassemble at seven o'clock for that rural symposium, a tea-dinner, four of our number disappear in hot haste, loaded with their traps, whilst a friend joins me in a prospecting tour.

How delicious the air is as we tramp upon the crispy heather! Every step seems to give us new life and strength, and we think of our former city selves with a sort of pitying contempt. We have reached the summit of a rocky knoll, and a dream of beauty lies before us. The silence in which it has spellbound us is broken by my friend croaking out, "It's not photographic!" Quoth I, "That's true; but I am determined to have it! Let us skirt round the valley till the view composes itself photographically. I expect from yon rock peering from the birches we shall find the fitting point of view. But, friend, there are some legs much given to make a toil of a pleasure; pray remember that, like the illustrious Hamlet, I am somewhat 'fat and scant of breath.'" And so with light hearts and hats we saunter on, happy as the skylark that hangs above us turning sunshine into music. Philosophers might moralise, as the bee hums, the bird chirps, and the rabbit starts away with pointed ears and white fud, how things so insignificant in themselves can add a charm to the sunny picture; but we are contented to enjoy life, pausing occasionally in our climbing to admire the view—that is, to take breath, and tell each other "it is very warm."

At last we mount the desired point. "That will about do," says my friend. To whom I reply, "Not quite; it wants a foreground. Let us try that peak behind the pines." As we mount the peak, I exclaim, "Now we have it! A few yards to the right—there! it is perfect!" I feel relieved like a man who has done his duty. Let us sit down now, and have a whiff of the cup—no, of the pipe—"that cheers but not inebriates."

Presently I rouse from a pleasant dreaminess, with a voice percolating into my ear, "Now, my fat friend! why did you choose this exact spot?" Puffing out a delicate cloud of the carbonised weed, I reply, "My thin accomplice! a multitude of collateral and unexplainable influences may converge to the formation of one resolve—that is to say, I felt it to be the right spot. To be more particular, we have a foreground here. You remember how a man brought his son to Sir Joshua for tuition, saying that he could already paint the background, and that Sir Joshua replied, 'Then he has no need to come to me.'"

"Now, what the background is to the portrait the foreground is to the landscape. Speaking generally, the whole effect of the picture depends on it. If you look through our exhibitions you will find many pictures that fail in effect for want of power in the foregrounds. When the upper and lower parts of a picture are painted with the same degree of power and technical detail they have a weakness and flatness of effect quite contrary to the feeling of nature. Observe these pines before us! About ten o'clock the sun will flash among their bold, shadowy branches; whilst that little pool to the left will reflect their dark stems in its quiet gleam—composing a powerful foreground, that will set off the retiring distances of the view. It is the great difficulty. The finest view without a good foreground will make a poor picture. Another thing in photography is—the distance must have a degree of distinctness about it. As seen from the other rock we were upon, the hill that concluded the view was so indistinct that it would have appeared in a photograph as a mere stain. Here, you see, it is different; we have some distinctness of rocky shape and shade. Then I came here, some paces to the right, to escape the straight line of that tall pine, which came close upon that other straight pine in the middle distance, jarring the eye. You ask me if one should compose by rule? It is better just to move about till the eye is satisfied.

"I believe that any sort of line or curve may appear in any part of a picture, on condition, look you, that it is duly balanced by the other parts and brought into harmony with the whole. A man with well-poised body and vigorous limbs may walk with what step he pleases, and climb where he will, and he will always look graceful and noble. A man not so fortunately constituted will find the greatest assistance in crutches; but he must not attempt the same height as the other, or when he thinks to be sublime he will only be ridiculous. If he would go safely he must go solely by the rule of crutch—that is a parable. If a man have not the feeling in him there are general rules that will greatly assist him—such as, to repeat the main lines and curves of his picture *with a difference, i.e.*, likeness in unlikeness, which is fundamental in all arts that deal with beauty or grandeur, as marked, for instance, in the cadences of music and rhythm, and more especially in rhyme, the whole charm of which lies in the same sound being repeated in a different form. Then there must be some contrasting lines and curves, and varied gradations and masses of light and shade, and a strong background—a figure seated on a wheelbarrow, or the like, casting a dark shadow along the ground, may do, if nothing better can be had.

"You ask me how a man is to know when he requires to compose by rule? There are two kinds of artists—the one is born, the other made. The one has an impassioned love of Nature for her own sake, the other regards her very much as a lay figure that will help him on in his business. Listen to Wordsworth:—

'When, like a roe,
I bounded o'er the mountains, by the sides
Of the deep rivers, and the lonely streams,
Wherever nature led—for nature then
To me was all in all—the sounding cataract
Haunted me like a passion; the tall rock,
The mountain, and the deep and gloomy wood,
Their colours and their forms, were then to me
An appetite—a feeling and a love,
That had no need of a remoter charm
By thought supplied, nor any interest
Unborrowed from the eye.'

"The man who feels like this is a born artist, upon condition that he has the faculties required for technical delineation. The made artist has merely the technical faculties, and must work according to the rules he has been taught; and, fortunately for him, there is a plentiful demand for the sort of pictures he produces, which are apt to run into hard and exaggerated details, just because he does not feel the subtle charm of nature. So in photography: almost any man, with observation and patient study of good pictures, may himself produce very acceptable pictures, especially if he confine himself to views of no great extent."

Raising myself from the reclining position, I exclaim—"What a scene this is! The very silence is sublime! What a mighty calmness of golden glare and tremulous dazzle! How gorgeously that bank of wood rejoices in the sunshine! And what repose comes from those birches on the opposite cliff that droop their beauty against the bosom of the sky! And how that tender heat-haze at the base of the hill softens the distance, and adds a charm to the whole scene! Photography is impotent here. We require a lower light to throw out shades, and get a mellowing idea of the different distances; for it cannot be too strongly impressed that without due gradations, as well as masses, of light and shade a true idea of nature cannot be rendered on a small scale. The wide glare of view that is sublime in its magnitude would look petty and lose all character on eleven inches by nine. And now, my friend, let us walk round that grand hill and be back for the great event which is to take place at seven o'clock."

And now it is eight o'clock. The tureen of "hotch-potch" has been emptied; the salmon has vanished; and the other things—where are they? Packed very safely away. A philosopher could not have a better opportunity of reflecting on the wonderful connection of the inner and outer man, and how the mind is improved in proportion as the stomach is contented; for we are growing as wise as Burns' "twa dogs," and as funny as—as everybody is in like circumstances. Our friend of "the wet" is the grand butt of the evening. It seems that when his tent was stretching its legs one of them gave way, and the bath, plates, and developer fraternised together in a mode that left him nothing to do, poor fellow! but admire nature and feel miserable. But "nae man can tether time or tide;" and as our legs grow conscious that they also have been pretty well stretched, we call for the old lady and the candles, having agreed to meet for breakfast at six o'clock.

Accordingly we have reassembled at that hour to congratulate each other on—a day of pouring rain! Of course, the wit of the company—and a small ingredient of that article goes a great way in such circumstances, when everyone is prepared to be jolly—is levelled at me for having let the fine day slip; and, of course, I fall back on the old tactics of carrying the war into the enemy's camp by advising them to set-to with their developing, and prophesying that half of their plates will be under-exposed—the motto now seeming to be "speed rather than excellence"—and that one of them at least will prove to have been exposed to two views. Whereupon I am saluted with a regular chorus of "fox and sour grapes," with original variations. "You want to know where I am going, do you? To have a walk, to be sure, among the hills: they never look grander than in such a storm. You wish me joy! thank you. And what of photography, do you ask? I have fixed on my view; and shall remain here till I take it in three different lights, giving to each two plates of different exposures; so that I am 'cock-sure' of a good picture. I already feel as if I had it safe in Edinburgh, and were exhibiting it in No. 5, St. Andrew-square." Whereupon one gentleman informs me that it is a pleasant exercise to cook your hare before it is caught; and another exclaims that there are people in the world who have the art of hallooing before they are out of the wood; and I retire amidst a volley of suchlike entertaining and instructive remarks.

I shall reveal no more of our rural life, except that in our merry-makings we are strictly sober and orderly; for we have come not merely to take photographs, but to lay in a stock of health. In short, we have turned ourselves out to grass. W. Neilson.

PHOTOGRAPHY IN COURT.

ACTION FOR DAMAGED PHOTOGRAPHS.

Zaehnsdorf *v.* Talley.

At the Westminster County Court, on the 11th inst., this case came on for hearing before the presiding judge, F. Bayley, Esq., in which the plaintiff, described as a bookbinder, of 36, Catherine-street, Strand, London, sued the defendant, a solicitor at Windsor, to recover the sum £5 15s. Mr. H. T. Roberts appeared for the plaintiff, from whose opening it appeared that the plaintiff was requested to mount some photographs in a royal album, which photographs were accompanied by letterpress, and were to be elegantly bound by the plaintiff, on an agreement stated.

The plaintiff having bound six volumes of the work, proving the delivery of them by his porter, and that the work was properly executed, concluded his case.

The defendant having been called, said that he was publishing the work in question, and that the plaintiff had so completely destroyed the photographs by improper mounting that they had entirely faded, and rendered his work unsaleable, by which he had lost a considerable sum, and this would form the subject of a cross action.

In cross-examination by Mr. Roberts, the defendant stated he had purchased the photographs partly from Messrs. Downey, of Newcastle-on-Tyne, and some from Messrs. Hill, of Windsor, but could not say exactly what he paid for them, as some of them were private photographs.

On the part of the plaintiff, Mr. Golding Fill, photographic printer, was called to prove that starch was now the material employed for mounting photographs. He never saw any spoiled by such treatment, and considered they faded from being imperfectly washed.

Mr. Vernon Heath gave corroborative evidence, adding that the permanency of photographs depended entirely upon their being washed thoroughly in several waters, and could not think the photographs in question had been injured in the mounting.

Mr. Lenthall and other witnesses were called, who considered that the injury was owing to undue washing.

Mr. Hill stated that the photographs he had supplied to defendant had been subject to a thorough washing in several tanks of water.

Mr. Roberts urged that it appeared evident his client was in no way liable for the damage done, as in the face of the evidence of expert witnesses the damage must have been caused by insufficient washing.

The learned Judge, in reviewing the evidence, found for the plaintiff for £5 15s., with costs of attorney and witnesses.

The case of Talley *versus* Zaehnsdorf was not gone into, the learned Judge considering he could only claim £3 out of £24 claimed for damage done, and disallowed the costs for witnesses.

Our Editorial Table.

Negatives by the Symmetrical Lens.

As promised in our last issue we now supplement our observations on this lens with a brief notice of some negatives produced by means of the instrument, and which have been submitted to us for critical examination.

In one taken by Colonel Stuart Wortley on a 13 × 15-inch plate, with a 9-inch focus lens, we have the full capabilities of the objective displayed; for, as may be reasonably supposed, the field of delineation is circular, and we can examine a much fuller extent of the picture produced than if a quadrangle had been cut out of it.

It would be absurd to expect a large plate like the above to be entirely covered by a lens of such short focus. But we find that every portion of subject depicted at all is delineated with a sharpness not anticipated under such optical conditions; for the stop was so far from being one of the pinhole character hitherto employed when covering large areas with lenses of short focus, that on this occasion a stop of a quarter of an inch, represented by $\frac{f}{36}$, was the aperture. Now when we consider that $\frac{f}{36}$ for very wide angles is by no means unreasonably large, the foregoing must be considered as a large aperture. With this aperture, then, the definition is simply perfect. When a magnifying-glass is applied to some plants and shrubs of various kinds in the picture (the scene pourtrayed is the front garden of Rosslyn House) each leaf is seen as crisp and fully detailed as if it had been taken to illustrate a volume on botany, the vines trailing upon the house itself being as sharp as if cut by the graver.

In another negative taken by "Marian," a lady artist, with a lens of five inches equivalent focus, we find that the definition extends over widely-differing planes. The view appears to have been taken from the middle or back of a drawing-room, judging from the furniture; the window is thrown open, and in a field or park outside we see cows feeding contentedly. At a still greater distance we see a hill clad with gardens and dotted with villa residences. Here, evidently, is a crucial test for the capabilities of a lens; and, when we find that a cluster of flowers inside of the room, the cows in the meadow in front, and the suburban residences in the extreme distance are all sharply defined, we conclude that the symmetrical lenses possess very great depth. From the perfect delineation of the cows feeding in the middle distance we infer that the exposure has been very brief.

A series of three 7½ × 5 negatives are more interesting to us than any of the others, because it shows a great power possessed by the lens (No. 3, the focus of which is five inches) by which it was produced. In one negative a wide-angle view is taken by means of the lens used as a whole—that is, in the doublet form in which it is sent out; in another, a view is taken on a much larger scale by means of the back lens alone, which is allowed to remain undisturbed in its place, the front lens only being unscrewed; the third is a stereoscopic view taken one by the front alone and the other by the back lens alone, for both being symmetrical one is exactly equal to the other in focus, construction, and defining power, and hence suitable for binocular views. These are all as fine as if they had been obtained by special lenses constructed expressly for each.

Dense Collodio-Bromide Plates.

By Colonel Stuart Wortley.

By no dry plates we had previously tried have we obtained more satisfactory negatives than those we have taken upon some plates forwarded to us for trial under the circumstances referred to in a letter by Colonel Wortley in another column. The subjects to which they were exposed embraced waterfall, river, garden, and bank scenery, together with archæological remains; and we have never tried any plates which pleased us more. While they were very sensitive, they also gave very dense negatives by one application of the alkaline developer, no after-intensification being required. The cause of this density and sensitiveness combined arises, we are informed, from the use of an entirely new kind of pyroxyline prepared by Colonel Wortley from an organic substance that has never hitherto been associated with collodion—a preparation of the nature of which our readers will be duly informed in course of time. In the meantime Colonel Wortley must be congratulated upon having solved a problem in connection with the preparation of dry plates, viz., the combining of great sensitiveness with ample density. The development proceeds so smoothly as to be entirely under control.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on Tuesday evening last, the 12th inst.,—Mr. Spiller, Vice-President, occupying the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Pritchard read a paper by Herr Obernetter, of Munich, on the reproduction of negatives. Specimens of negatives reproduced by the method described were handed round for inspection.

The Chairman said the subject was one of great interest, and had already enticed several into the field of experiment. Mr. Woodbury, among others, had brought some negatives very beautifully reproduced by him in a manner analogous to that employed by Herr Obernetter, the difference being that Mr. Woodbury substituted gum for dextrine, and glucose for sugar.

Mr. Woodbury's specimens were passed round for examination, and the thanks of the meeting were tendered to Herr Obernetter and Mr. Pritchard.

Mr. T. Sebastian Davies then took the chair, which Mr. Spiller vacated in order to read a paper *On the Asserted Influence of Colouring Matter added to Collodion in Rendering it Sensitive to Coloured Rays.* Pending the publication of Mr. Spiller's paper in our next we may state that his experiments went to confirm the results obtained by Mr. M. Carey Lea described in this Journal, and were quite different from those alleged to have been obtained by Dr. Vogel.

Mr. Stillman said that he had also tried several experiments in conjunction with Mr. Lockyer, and his conclusions were similar to those of Mr. Lea and Mr. Spiller. He had tried numerous experiments in spectrum photography with the plates of all the best makers, including those of Colonel Wortley, which he found to possess extraordinary sensitiveness, and on which he got better results than on any of the others he had tried. But, still, by no application of colouring matter to the film could he obtain a greater range of sensitiveness to coloured rays than when such colouring matter was absent. He therefore quite dissented from Dr. Vogel's conclusions. That gentleman had mistaken chemical for physical action, and it was quite useless to look for any prolongation of the spectrum from physical appliances, for he ought to look for it in the chemical appliances. He (Mr. Stillman) recommended that experimentalists should try carbonate of silver as well as the fluoride for obtaining sensitiveness over an increased spectral range. He considered that Dr. Vogel was wrong, and he (Mr. Stillman) quite agreed with Mr. Lea.

Colonel Stuart Wortley had been present when Mr. Stillman tried some of the spectrum experiments referred to, and he had himself also tried the carbonate and fluoride, but he had not yet attained the success he had anticipated. He found, however, that by adding the nitrates of certain other metals to the bromide of silver certain valuable effects were obtained. The nitrate of nickel, for instance, was one of those that was specially valuable. He had also been trying the effect of adding organic bodies to his collodion, salicine being one of those that he had thus used upwards of a year back. He had also obtained some valuable results by a solution of salicine in sulphuric acid.

The Chairman expressed a hope that the subject would receive further elucidation at the hands of the members, and proposed the thanks of the meeting to Mr. Spiller.

Mr. Spiller again resumed the chair.

Mr. George Hooper then read a paper entitled *Experience with the Collodio-Chloride Process*, and several specimens were handed round.

The Chairman directed attention to some of the prints which he knew had been done more than two or three years ago, and said that they were quite changed, with the exception of one which had received a slight abrasion.

Mr. Sawyer said he had some experience with collodio-chloride, and had made some whole-plate transparencies by its means which after two or three years had faded very much indeed. He failed to see the commercial value of the process; for the paper was more expensive than albumenised paper, while the results were certainly not better. For printing on opal glass nothing could exceed the beauty and simplicity of the carbon process, whilst its permanence was undoubted.

After some remarks by Mr. Pritchard and Mr. Blanchard, in whose hands the process had proved permanent, the Chairman thanked Mr. Hooper for his communication.

The meeting was then declared a special one; but, owing to the lateness of the hour, many members had previously withdrawn, and the attendance, therefore, was somewhat scanty. A detailed report of the business transacted would be unnecessary, the chief business being the adoption of a motion by Mr. Hughes relating to a minor alteration of the laws, so as to permit the members to nominate at that meeting officers to fill the vacancies created by resignations.

After its adoption, and before proceeding to nominate, a motion was made by Mr. Hooper, the effect of which was to ignore all existing rules for the election of officers, and in lieu thereof to issue blank papers to all the members of the Society, accompanied with a list of members for them to select from such list the persons they thought best to fill the various offices, from that of president downwards. This gave rise to a heated discussion, several members protesting against the proceeding, and exposing its illegality. The motion was, however, carried by a majority, and a committee of seven was appointed to carry it out.

After a vote of thanks to the Chairman, the meeting was adjourned for one week.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Wednesday, the 6th inst., in the Hall, 5, St. Andrew-square,—the President, Mr. R. G. Muir, in the chair.

The minutes of previous meetings were read and approved, and the following gentlemen were admitted ordinary members:—Dr. David Murray, Messrs. Robert Smith and William Cumming.

Mr. William Neilson then read a paper entitled *Landscape Photography: Its Pleasures and Profits.* [See page 231.] At the conclusion of the paper he (Mr. Neilson) said that he had amused himself by making some approximate calculations of the quantities of some of the materials consumed by photographers; as, however, his paper had taken up so much time, he would not then trouble the members with the results. But he might just mention one item which he thought was very suggestive, and it was that, in addition to what they might consume at the breakfast table, photographers throughout the country used about one million of eggs per annum in the various processes into which albumen enters. He also added that, before sitting down, he might call the attention of the meeting to two of the very beautiful autotype enlargements which were hung on the wall, as they formed capital illustrations of his remarks on the importance of suitable foregrounds. One was a very fine photograph of the *Trossachs*, with Ben Vennue in the distance—or, rather, it ought to have been in the distance, but in consequence of the want of a suitable foreground the smaller hill with the trees seemed to be really a part of the larger mountain, the composition being altogether faulty and the effect unnatural. The other picture was a view of *Loch Katrine*, which, although not better as a photograph, was really a grand picture, and gave a true conception of the view. If, however, the members would cut off the foreground, the charm and grandeur and natural effect would be lost, as the idea of distance would then be almost entirely absent.

Mr. Ross said that he was probably one of the very earliest landscape photographers, and he could assure all present that there was a charm in the practice which only landscape photographers could appreciate. He could endorse every word Mr. Neilson had said of its pleasures. It had, no doubt, its drawbacks, as everything else had, but none that with care, judgment, and patience might not be overcome. The painter could select the point of view which pleased him best, and if the foreground was not to his liking he could select one more suitable and put it in; but no such good fortune fell to the lot of the photographer. He had to move from point to point till he got what was required; and, if his soul were in his work, he did not grudge to travel many a long mile to secure his object. His own habit had been to devote the misty days to such prospecting; and even that was glorious work, as the fine old hills of their native land never looked so grand as when seen by glimpses through masses of rolling mist. Those who determined to produce good landscapes must not expect to be able at all times to do so, but must patiently wait for suitable atmospheric conditions. The work of several of their popular landscapists was very justly admired; but few of those present knew how long they would have sometimes to wait before they got what they wanted. Probably one of the most popular pictures in the market was that of one of their highland bridges; and if patience in its production was an element of popularity it well deserved it, as the photographer actually waited in the vicinity for six weeks before he was satisfied with the conditions under which the negative was taken. He was glad to say that landscape negatives had not as yet been to any extent subjected to the abomination of retouching, and he hoped they never would. The truth, and nothing but the truth, should be the motto of every landscape worker; and he should look upon any proposal to bring the landscape negative under the retoucher's hand as a charge against the Divine Architect of having done His work imperfectly.

Mr. Panton then stated that the President and he had, the previous week, made a short tour with their cameras, and gone as far north as the Clachan of Aberfoyle. The result of their trip had been some fairly good negatives, prints of which he laid on the table for inspection.

After the prints had been examined,

Dr. Dickson said he thought that Mr. Panton had hardly done justice to the President and himself in speaking of the negatives as "fairly good." They were, he thought, specimens of very high-class landscape work, and showed not only that the dry plates used were faultless, but also that he (Mr. Panton) knew how to use them to produce the very best effects. He would like to know what dry process Mr. Panton had been working.

Mr. Panton replied that it was one that the dry-plate workers of the Society generally liked very much. It had been introduced by the Vice-President some years since, and was well known as Davies's "beer and albumen process."

The adjourned discussion on preserved sensitised paper was then resumed.

Mr. Turnbull stated that since his introduction of the subject he had continued his experiments, and found that the strength of the citric acid solution then recommended was not sufficient to keep the paper for any great length of time, but that if increased to fifteen or twenty grains per ounce he thought it would keep indefinitely.

A letter was read from Mr. Peat, of London, in which he said that he had got some of Durand's paper in 1872, that it had been forgotton till December, 1873, when it was found quite brown. He had, however, printed some pieces of it then, and three months after they were put into the toning bath, when, to his surprise, the discolouration altogether disappeared, and they turned out good prints, with "fine creamy skies and white high lights." Some of the prints were exhibited, and seemed pretty good, and not unlike results from recently-sensitised paper.

Dr. John Nicol said that he had intended to make an examination of some of the commercial samples of sensitised paper, but had only made a commencement of his experiments that afternoon. The samples showed that they all contained a large excess of acid. He hoped by the following meeting to be able to report both as to the kind and quantity of acid in each sheet, and also whether the acid had been mixed with the silver in the bath or in a separate solution, as used by Mr. Turnbull.

Mr. Milliken showed some prints on Carrier's paper, mounted on a card along with one on paper recently sensitised. The paper had been kept for four years, and was perfectly white. It printed rapidly, but the finished print showed a want of brilliancy when compared with that on paper recently sensitised. He said, however, that he did not know whether the rather dull effect was peculiar to the paper originally, or had been caused by change consequent on age.

The attention of the members was then directed to a collection of large photographs of the Yosemite Valley, kindly lent by Mr. J. R. Carphin, which were hung on the walls, and also some fine enlargements by the Autotype Company, from negatives by Wilson and Burns. The collection was very much admired, and the photographer, whoever he may have been, was complimented on the energy and determination to overcome difficulties shown in the production of such large pictures of almost inaccessible portions of the country.

Votes of thanks were then awarded to Messrs. Neilson, Carphin, and the Chairman, and the meeting was adjourned.

Correspondence.

M. Vidal's Process.—Reversed Negatives.—Bilot's Retouching Varnish.—M. Humbert de Molard.—A Pint *versus* a Pound.—Hints and Experiments.—Small Photographic Establishments. — "Ball-room." — Cyanide. — Glycerine. — Coloured Tapers.

At length I have received the long-expected letter from M. Léon Vidal, but the promised specimens have not yet arrived. He has been, of course, exceedingly busy all these weeks, and has only just despatched his pictures to the exhibition of the Photographic Society of France. There are eight frames of these, each polychromic specimen being accompanied by one in monochrome from the same negative, by way of comparison. One of these is an architectural subject measuring 54 × 35 centimetres (22 × 14 inches). There are also portraits of large size, and small medallions; also a beautiful copy of a painting. In a word, M. Vidal is more and more in love with his process the more he sees of it, and he is now more convinced than ever that it is commercially practicable.

M. Beauvallet recommends taking reversed negatives *through* the glass, instead of by reflexion. This has been always my own advice, and what rational objection can there be to it? Why do not the makers of cameras contrive their dark slides so that a plate can be inserted with the film either towards the front or back shutter at will?

M. Gauthier-Villars has just published a work by M. Dumoulin, entitled, *Manuel Elémentaire de Photographie au Collodion Humide à l'Usage des Commençants.*

M. Bilot recommends the following varnish for retouching negatives, viz.:—Gum arabic one part, water seven parts; bichromate of potash three parts, water seven parts. Add as much of the latter solution to the former as will give it the colour of Madeira wine (by which is meant in France, Marsala). Apply this to the film, and, when dry, expose it to light so as to harden it. This will form an insoluble varnish upon which retouching may be easily done; it will also protect the negative perfectly during the printing. The idea seems to be a capital one.

M. Tullet recommends as a means of strengthening feeble negatives to put them into an old gold toning bath before fixing.

Another of the fathers of our art has passed away. M. Humbert de Molard died a few weeks ago, at an advanced age. He was one of the founders of the Photographic Society of France, a fellow-worker with MM. Niepce de St. Victor and Brebisson in photography upon glass, and a man remarkable for inventive genius as well as for great kindness of disposition. His loss is much regretted in France.

I have not yet received any reply from M. Silvy respecting his studio. His own remarks would be valuable, although the construction of his studio has already been described in this Journal. He is a great sufferer from gout, and is just now travelling in the Jura and the South of France.

The late Sir Robert Peel once startled the House of Commons by asking "what is a pound?" and I have endeavoured lately to startle some of my readers by asking them "what is a pound of collodion?" I have had two replies to this query by private letter—one from a large manufacturing chemist, the other from a large vendor of photographic materials. The "Peripatetic" has also told us that in the case of collodion a pound and a pint are pretty nearly synonymous terms. The manufacturing chemist says that a pound of collodion means a pound weight avoirdupois of sixteen ounces; and the vendor of materials used in our art tells me that a pound of collodion is generally understood to mean a pint of twenty fluid ounces, but that a pound of varnish very often only means sixteen fluid ounces. Since sixteen fluid ounces of water weigh a pound avoirdupois, it follows that bromo-iodised collodion having a specific gravity of ·800, will require twenty fluid ounces to weigh the pound. Also, since the specific gravity of alcohol with which varnish is made is about ·820, sixteen fluid ounces, with the addition of the gums, will weigh about a pound avoirdupois. There is, consequently, no trade trick by which the purchaser is imposed upon in buying collodion and varnish by the pound instead of by the pint; but, on the other hand, there is no good reason for the practice, and some evident good reasons against it. It is a troublesome job to ascertain whether one gets good weight in buying a liquid by weight, because you have not only to weigh the liquid but also the vessel which contains it; whereas it is simple enough to ascertain whether you get good measure in buying a liquid by measure. In buying collodion and varnish by the pound it is uncertain how much you get by measure, on account of the varying specific gravity of these liquids. The practice of selling these substances by the pound ought, therefore, I think, to be condemned, because it renders a fraud more easy on the part of the seller, and introduces some uncertainties on the part of the buyer.

My juvenile readers may make the following amusing experiment with some of the chemicals which are to be found in a photographic laboratory :—

Place five glasses in a row, then pour into the first a solution of iodide of potassium, the second a solution of corrosive sublimate, the third a small quantity of iodide of potassium and some oxalate of ammonium, the fourth a solution of chloride of calcium, and the fifth some sulphide of ammonium. Now pour part of the contents of the first glass into the second, and a scarlet colour will be obtained; next pour the second into the third, and the mixture will be colourless; again, pour the third into the fourth, and the contents will be white, finally, pour the fourth into the fifth, and the mass will be a dense black. Then you will have had two glasses colourless, one scarlet, one white, and one black.

M. Girard, the well-known French chemist, states that he can make blue-black by substituting diphenylamine for aniline. The sodium or ammonium salts of the sulpho-acids should be used.

An old and dirty sponge may be cleaned by first soaking it for some hours in a strong solution of permanganate of potass, then squeezing it, and putting it into a weak solution of hydrochloric acid—one part acid of commerce to ten parts water.

Coming by train the other day from Southampton to Chester I could not help comparing the difference between English and Brittany farming, and drawing some general conclusions therefrom in reference to the present state of professional photographic portraiture. In Brittany we have an example of the state of agriculture in a country divided into a large number of small farms, averaging, say, twenty acres. There is the waste of land by the frequency of thick overgrown hedges bounding small fields; and the miserable cultivation of it, due to the want of capital, intelligence, and suitable implements. Talk to a Breton farmer of the steam ploughing or reaping-machines, clod crushers, cultivators, &c., and he stares at you as if you had dropped from the moon. He knows next to nothing of the principle of the division of labour, or of doing things on a large scale with the aid of capital, under the direction of science; and the consequence is that his land does not yield half what it might be made to do under better management, whilst he and his family go on living in a state of ignorance and superstition, and hand down the same traditions to their descendants.

Now, much the same sort of thing seems to prevail at this moment amongst the professors of photography. They remind me somewhat of the Breton farmer, with his small fields, thick hedges, clumsy appliances, and unintelligent mode of doing his work. They go on in the same small way; in the same hot, confined, glaring, and ill-contrived glass houses; employing the same old processes and lenses which were in use twenty years ago; and doing work which is in general so bad that it would not pass at all nowadays without the aid of the retoucher. Take, for instance, a town of fifty thousand inhabitants, and you find in it eight or ten professional photographers struggling for a small income, each with, perhaps, but one assistant, and with appliances which, if brought to the hammer, might not realise a couple of hundred pounds. Of what use is it to talk to such gentlemen as these of new styles of portrait, new modes of colouring, correct modes of lighting, artistic posing, carbon printing upon glass, a rapid new process, or an important new camera? How is it possible for them to experiment with such things, or attempt to introduce them? Are they not in a precisely similar predicament to the Breton farmer when you describe to him a steam plough? Of what real practical value to them is a publication like THE BRITISH JOURNAL OF PHOTOGRAPHY? How many of its articles do they seriously read and study? What does it matter to them whether the collodion backing to a plate reflects two images or one? whether a gelatine film becomes mouldy or not? whether the blacks of their negative are composed of metallic silver, or sub-iodide, or oxyiodide? Of what use to them is such a journal practically, except for its scraps of gossip and its advertisements?

What we want in professional photography is evidently to work on a larger scale, and with more reference to the scientific employment of capital and the principle of the division of labour. Instead of half-a-dozen small establishments in such a town as I describe we want one large establishment, conducted on right principles, and absorbing the cream of the business. Let me attempt to give a sketch of what such an establishment ought, perhaps, to be.

In the first place, there would be the capitalist who supplies the motive power, money, for which he would expect a return of ten per cent. per annum. Then there would be the premises and the plant, all constructed on right principles. Then the real artist, whose sole business it would be to pose the sitter, the former being a man of cultivated taste, refined mind, and who would understand this branch perfectly although he might know very little, perhaps, of photographic manipulation or processes. Then there would be the operator who prepares the plate and developes the negative, and who can put his materials right when they get out of order. Then there is the retoucher of the negatives; and, lastly, the printers, in all the various departments, and the artists who colour the proofs.

Now suppose a new process suggested in this Journal, or a new style of portrait, or some new piece of apparatus—how would it affect such an establishment as this? Clearly, no experimenting could be going on, for that would be fatal to any purely commercial undertaking; but what would happen would be this :—It would be known that anything really good and *perfected* would be taken up by such an establishment as I describe—just as a man who farms three thousand acres instead of twenty would take up with a steam threshing-machine or plough—and, therefore, any experimentalist who had really brought to perfection a new and useful invention in photographic portraiture would know that he would only have to demonstrate its utility practically before the principals of such an establishment to have it at once introduced there. The result would be, first, a stimulus to invention and experimenting; secondly, an advance in the art and in the social status of its professors; and, lastly, a gain to the public, who would get a better art-product at a lower price.

As it is, the most useful and valuable suggestions fall flat upon the photographic profession, and lie for years unemployed or altogether buried. We want some such large establishments as I have described, whilst the present smaller fry would find their place in connection with them. Photographic portraiture has now received such an enormous development in all civilised countries that a capitalist might safely embark his money in such an enterprise as I describe if it were conducted under really judicious management; but that would involve that the head of each department should be thoroughly competent in his own speciality.

Imagine, for the sake of example, such an establishment existing in the outskirts of the city of Chester; and let us suppose that an experimentalist has brought to perfection the bromide process with the bath, and has taken a dozen good negatives as specimens. He goes to the principals of this establishment, shows his negatives, and offers to demonstrate the capability of his process practically in their own studio. He succeeds. The time of exposure is reduced considerably; the picture may either be a positive or a negative at will; the plate may remain any length of time in the dark slide without injury while the sitter is being posed, and it may be kept in water always ready for use when a sitter arrives. These are found to be solid advantages; so the experimentalist who has mastered the new process receives at once an offer of permanent employment; in fact, he steps, perhaps, at once into the shoes of the principal operator.

Again: let us suppose that an artist exhibits a dozen portraits upon glass, magnificently printed, coloured, and got up, and as permanent as vitro-enamels. He proves that he can do such work with tolerable rapidity and at a moderate price, and then, of course, he is only too gladly put upon the staff of the establishment. Here, again, would be the certain reward to an individual for perseverance and ability shown in carrying out a useful suggestion.

I am only describing what is happening every day in all directions about us in our own great country in most other branches of industry. Why, then, should it not happen also in professional photographic portraiture? Are we to conclude that the profession is composed of men so unintelligent and unenterprising that no capitalist will venture one or two thousand pounds upon such an undertaking as I describe in a town of fifty thousand inhabitants?

The present state of photographic portraiture proves to demonstration that the *photographic* part of the business has come to a dead lock, and that photographic portraits will not pass muster without the aid of the retoucher. Photography unaided by the pencil will not do sufficiently good work to please the present taste of the public, and the consequence is that portraits are now so laboriously worked up by the artist that the likeness is greatly disturbed, and the result but too often reminds one of a copy of a wax model, or a marble bust, with glass eyes, real hair, and real drapery.

If we are to improve upon this we must have an improved studio, an improved negative process, an improved camera, and an improved method of printing and colouring. But how can all these improvements be adopted by the present class of professional photographers, working on a small scale, in small premises, with limited capital, and but few assistants? The thing is impossible. Many of them, no doubt, are gentlemen of education, taste, and ability; but how can they give up their precious time to the experiments which are necessary to learn new methods and operate with new appliances?

I venture to make these remarks, first, in the hope of inducing capitalists to embark in some such undertaking as I suggest; and, secondly, in order to encourage experimentalists in their endeavours to perfect such novelties as may one day be remunerative when properly carried out.

In a recent letter I made some remarks about champagne (sparkling gooseberry) as a remedy for sea-sickness in crossing the channel to see the Photographic Exhibition in Paris, at the Palais de l'Industrie. I feel morally bound to qualify this advice after reading the following remarks in the *Nautical Magazine*:—

"PETROLEUM AS A BEVERAGE.—Every one knows that the districts where grapes are grown of which champagne is made are not sufficiently large to produce grapes for a fifth of the annual champagne supply. Four-fifths of the champagne drunk is therefore quite innocent of any acquaintance with the production of the champagne districts. Much credit may be due to manufacturers of wine for having discovered methods whereby a decoction or infusion of gooseberry, rhubarb, plums, and even of turnips—with a judicious addition of chemical flavouring matter—can be passed off as champagne, or Moselle, or sparkling hock; but we are not so sure that credit is due to the discoverer of the method whereby petroleum is made to do duty as champagne. We are nevertheless assured that American mineral oil refiners and brokers sell large quantities of their oil to champagne makers. It is mechanically mixed with glycerine, is then aerated by a soda-water machine, and is technically known as 'Ball Room.' It produces headache of the very worst description, severe diarrhœa, and lasting evil effects. A consignment has, it is said, reached England, *viâ* France."

Never use red or green wax tapers. The red ones contain a good deal of mercury, and the green ones arsenic.

It is horrible to think how freely photographers use that most dangerous poison, cyanide of potassium. Remember, dear reader, when you rub it upon your hands to take out stains that there is nothing between you and instant death but a cuticle no thicker than paper, which may or may not be abraded; and that when you inhale the fumes the poison enters your system by absorption through the delicate membrane of the lungs. Although the constant use of cyanide may not be attended by immediate bad effects, yet you will infallibly pay the penalty for such folly in your old age. Sooner or later the penalty *must* be paid.

Glycerine is now much used in photography. As a test of its purity rub some upon the hands. It ought not to produce any smarting sensation from the presence of unremoved fatty acids. If it redden litmus paper it will render plates very slow which have been coated with a hygroscopic preservative containing it. Pure glycerine is neutral.

Stoak Vicarage, near Chester, THOMAS SUTTON, B.A.
May 8, 1874.

P.S.—Since writing the above I have received from M. Vidal a very pretty specimen, which I will describe in my next letter, and will also send it to our Editors to exhibit.—T. S.

RAPIDITY AND DENSITY CO-EXISTENT IN EMULSION PLATES.

To the EDITORS.

GENTLEMEN,—Your excellent correspondent, Mr. Sutton, has often said that sensitiveness and density cannot be obtained together in emulsion plates.

This used to be the case, but I have now found an entirely novel method of making pyroxyline; and I beg to submit to you a few plates that you may judge for yourselves. Give them about the exposure of a wet plate and develope with a strong alkaline developer, and I venture to think you will admit that I have done what our friend has so often challenged me to do.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove End Road, N. W., May 12, 1874.

[Our opinion of these plates will be found expressed in "Our Editorial Table" in another page.—EDS.]

MR. FERRANTI AND HIS PROCESS.

To the EDITORS.

GENTLEMEN,—As one of the "unscrupulous individuals" referred to by Mr. Ferranti in his letter to you of May 4th, I very much regret that a reply from me is necessary, the matter being purely personal.

I am a licensee under the so-called "Ferranti-Turner" patent, and have paid for certain exclusive privileges, including the right to keep the method in my own hands or to dispose of it to other parties.

As it is probable I may have to resort to legal measures, on account of the damage to my interests Mr. Ferranti's "caution" and letter may have caused, I refrain from making further remarks. I, also, have to appeal to your sense of justice and honour in claiming the right to reply, although not specifically named in the letter referred to.—I am, yours, &c., A. BROTHERS.

Manchester, May 11, 1874.

To the EDITORS.

GENTLEMEN,—Mr. Ferranti's manifesto in your issue of last week is, to say the least of it, ill-advised. He ought to be aware that he sold to Mr. Brothers, of Manchester, the right to use, sell, or otherwise employ at his discretion what is known as the "Ferranti-Turner" process, and that this right extended over an area of more than three hundred square miles. That he has sold this right to Mr. Brothers is evidenced by the agreement which he (Mr. Brothers) holds. That agreement I have seen, I should think, a dozen times. It is authenticated by the (to me) well-known autographs of Mr. Ferranti and Mr. Turner. Its wording is concise, its meaning unmistakable, and its burden to the effect I have named. Mr. Ferranti's statement in his "caution" that "no licensee is at liberty to work for other photographers in his own or other towns" is at direct variance with the terms of Mr. Brothers' agreement. It is calculated to be highly prejudicial to the interests of Mr. Brothers as well as to my own, and can only be charitably accounted for on the supposition that Mr. Ferranti has, in this instance at any rate, sold a privilege of which he made no memorandum, and then forgotten all about it.

I am the author of the circular which has moved Mr. Ferranti so powerfully, and if there is anyone to whom the title is applicable, I am the "unscrupulous individual" who seeks to "rob" him of his "due." No one who has done me the honour of reading my communications to this Journal will believe for a moment that I have any wish to witness or take part in depredations upon inventors; I have always advocated their remuneration, and do so still. At the same time I advocate no less earnestly the rights and privileges acquired by purchase from them by their clients.

"'Tis true the world was made for Cæsar,
But 'twas made for Brutus too."

In conclusion: whilst I would not willingly be thought capable of taking offence at all the idle words I hear, I am certainly of opinion that Mr. Ferranti ought to make a public acknowledgment of his error in using language which many of your readers have no alternative but to regard as an assault on the honour of Mr. Brothers and myself.—I am, yours, &c., D. Winstanley.

The Doctor's Cottage, Blackpool, May 9, 1874.

FLUORINE AS AN ACCELERATOR.

To the Editors.

Gentlemen,—In your issue of January 16, under the heading *Fluorine as an Accelerator*, you suggest the use of a fluoride in dry-plate work. Having had the trouble of sending nearly a hundred miles for some fluoride of potassium (label—"*Kalium Fluorat*"), I think I should send the results of a couple of trials as a kind of "thank-offering" for the interest you show in, and the help you extend to, dry-plate workers.

In the first experiment the fluoride was added to salicine preservative to the extent of one grain to each ounce; the effect was *no* increase of rapidity, and a sort of granularity in the finished negative which was entirely absent in plates made with the same emulsion (excess of silver five grains to each ounce) organified with plain salicine preservative. The fluoride plates were just as clean and free from fog as the others, the fluoride seeming to have no effect whatever.

The second trial was made by adding one grain to two ounces of bromised collodion; after standing six hours it had apparently taken up about one-half of it. Six drops of nitric acid were then added, and the collodion was sensitised (excess of silver five grains to each ounce); after standing twenty-four hours the plates were made, and Wortley's salicine preservative used as an organifier. The plates were very dense, had a sort of brownish tinge by transmitted light, and by reflected light were more like a piece of enamelled cardboard than anything I can compare them to.

On exposing and developing one of the fluoride plates along with a plate made in my usual way I was much gratified to find the fluoride plate more than *twice as rapid* as the *old standard;* but was puzzled considerably, on washing off the developer and applying a weak solution of hypo., to find it did not clear the plate. I made a stronger solution, but still no effect. I then placed the plate in a saturated solution for fifteen minutes, with the same result, viz., not the least sign of clearing.

The plate now looks like a piece of dense opal glass with a negative image printed on it. A strong solution of cyanide was afterwards tried on it, but had no effect.

Why the plates acted in that way I am unable to explain, and have come to the conclusion to put my bottle of *fluoride* away carefully, until further experiments are suggested.

Several plates organified with Mr. M. Carey Lea's albumen preservative (see your issue of April 10, page 70) have given good results as far as definition of distance goes, but on account of having used Mr. Tunny's gelatine substratum they blistered. This gelatine substratum is so much better than albumen for dry plates that I would advise all dry-plate workers to, at least, give it a trial, and I think they will thank Mr. Tunny for his article in the Almanac (provided they don't use a gum preservative).—I am, yours, &c., Lewis T. Young.

Philadelphia, U.S., April 27, 1874.

[Several charming unmounted stereoscopic prints were enclosed, for which we thank our correspondent.—Eds.]

ANSWERS TO CORRESPONDENTS.

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

⁂ Owing to an unusually heavy pressure upon our columns this week we are reluctantly compelled to leave over many articles, reviews, and notices, among these being communications from Mr. M. Carey Lea, Mr. J. W. Gough, and Mr. Joseph Collier; Review of the *Photographs at the International Exhibition;* a notice of Messrs. Harvey, Reynolds and Co.'s new "Harrogate Head-rest;" article on *Is Flatness of Field Desirable in a Landscape Lens; Notes from the North*, &c., &c.

Cadmus.—The largest stop is $\frac{f}{12}$, the smallest being about $\frac{f}{38}$.

G.D.—Thanks for memorandum on silver residues. In our next.

An Improver.—1. Try the carbonate toning bath.—2. Judson's dyes are the most suitable for this purpose.

P. M.—Use protonitrate of iron for your developer. The easiest way to make it is by double decomposition with equivalent quantities of sulphate of iron and nitrate of barytes.

Baynham Jones.—We share with you in your great interest in Mr. M. Carey Lea's new emulsion process. We shall examine the print to which you direct our attention, and shall communicate with you on the subject.

A. J. Corrie.—1. The packets contain what appear to be the materials for fireworks of some kind.—2. We do not know any effectual means of purifying ... palm-oil barrel so as to fit it for collecting rain water in. Perhaps ...rrespondent will supply the required information.

Amateur (Barrhead).—1. The presence of an air-bubble in a lens does no more harm than would result from a speck of opaque dirt of the same size upon the surface of the lens—that is to say, it stops an infinitesimal portion of light. If the lens be otherwise good it would be unwise to reject it on this score.—2. Keep it in the dark.—3. We know of no other photographic societies in this country but those mentioned in our Almanac for the present year.

H. B. Berkeley.—Our correspondent says:—"I see that Colonel Wortley mentions in an article in The British Journal of Photography of April 18, 1873, that it has long been a favourite method of his to make the bromide of silver separately, and then add it to the collodion. Do you know how he proceeded? I have only been able to prepare very granular plates by this method, with dark (by transmitted light), crapy-like lines of coarser bromide running across the plate."——As we are unable to answer Mr. Berkeley's question, we have no doubt Colonel Wortley, with his usual courtesy, will give the information required.

W. Fisher.—The sensitive material employed by M. Joubert in the production of his photographs on glass in enamel colours will answer quite well for reproducing negatives. It is very sensitive, requiring an exposure under a negative in sunshine for only a few seconds. The preparation is composed as follows:—

Saturated solution of bichromate of ammonia	5 drachms.
Honey	3 „
Albumen	3 „
Distilled water	20 to 30 „

Mix, and filter in the dark room. Coat the plate, dry it by heat, and immediately expose it under the negative.

J. W. G.—While the *best* form of condenser is that in which a plano-convex or meniscus is united to a double convex, we have known good results obtained by the union of two plano-convex lenses. But in the event of the former kind being employed it is essential that the flat side be placed next to the light. Unless this be done the latter condenser will prove the better of the two. The diameter of condenser found to be most generally useful is four inches. Three and a-half inches prove rather too small for showing a cushion- or dome-shaped picture of the standard size, for it causes the corners to be cut off; but for a circular three-inch picture this size will answer very well. The best burner is that in which the gases are mixed previous to their issuing through the orifice of the blowpipe or jet; but as the other, or "blow-through," kind is so much safer we advise its adoption in preference—at least until the exhibitor acquires some knowledge and experience with the lime light. If a light other than the oxyhydrogen is to be used an argand paraffine lamp will give a light of much greater intensity than common gas, no matter what burner is used with it.

Geo. S. Wright.—1. Pour your silver solution into a flat dish, place it in your kitchen oven or in any other warm place so as to evaporate the water, and then place all the crystals in the platinum vessel of which you are the fortunate possessor, applying sufficient heat to fuse the mass. Next dissolve the fused nitrate in distilled water, and you will find that the copper will have been oxidised and will remain at the bottom of the vessel as a black insoluble body.—2. To precipitate silver in a metallic form from old baths or other solutions of the nitrate no method is more ready or convenient than the immersion in it of a bar or slip of clean copper. It is no sooner immersed than the silver rushes, as it were, to it, forming and clinging to its sides until, in a minute or two, the mass becomes so heavy as to fall off, when its place is immediately supplied by a fresh deposit; and this continues until all the silver has been precipitated, leaving the liquid green from the presence of the copper dissolved by the nitric acid which previously held the silver in solution.

Permanent Sensitive Paper.—Mr. Richardson has described before the Boston Photographic Association his method of preparing permanent sensitive paper. He says:—"Supposing that you are using a forty-grain bath, slightly alkaline, prepare the following, which we will call No. 2:—

Nitrate of silver	1 ounce.
Nitrate of ammonia	1 „
Loaf sugar	32 grains.
Citric acid	160 „
C. P. nitric acid	½ drop.
Water	16 ounces.

Filter, and place in a tray beside your usual bath, which we will call No. 1. Float your paper from two to three minutes on No. 1, drain well, and place directly on No. 2. Leave it until a second sheet is ready to remove from No. 1; then hang the first up to dry. Proceed in the same manner till you have sufficient to last a week or more. When dry smooth it out face downwards on a sheet of tissue paper, and roll it back inwards, and in half an hour it will lie flat in your drawer. This paper will now keep two or three weeks in cool weather, and when required for use is fumed with strong ammonia for one hour. After fuming it will not keep so long, but may be relied on for a week at least. Print about the usual depth, and the prints will keep white before toning as long as the fumed paper."

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 733. Vol. XXI.—MAY 22, 1874.

IS FLATNESS OF FIELD DESIRABLE IN A LANDSCAPE LENS?

We have for so long a period been accustomed to regard flatness of field as an essential requisite in a landscape lens that we have never thought it worth while to speak of this quality or to enforce its value by any argument.

During the past week, however, our attention has been specially directed to this quality by a correspondent who has been making several crucial optical experiments with wide-angle lenses, and who has had the resulting negatives carefully examined under a microscope, with the view of discovering in what essential point a lens of a special construction differs from an instrument of another kind, both, however, being of the same focus and worked with a diaphragm of the same size.

By one lens distant objects and the portions of the negative all along the horizontal line are rendered with great sharpness, the sides of the picture being almost as well delineated as the centre; but some stones and shrubs in the immediate foreground, and within a few feet of the camera, are less sharp. In the picture taken by the other lens the extreme and middle distances are exquisitely rendered, especially near the centre; but the definition becomes impaired towards the margin. The stones in the immediate foreground, however, are better defined than in the previous case.

Without instituting any invidious comparisons between the powers and peculiar qualities of the two lenses to which reference has been made we shall take the subject generally, as presented by the experiments, as a theme for a few remarks.

The value of a lens depends upon its suitability for the particular class of work to which it is intended to be applied. Let us take two cases of quite an antithetical character, namely, the production of an instantaneous street scene and the copying of an engraving on a scale embracing a large angle. The conditions to be fulfilled here are different; hence the optical means best suited for the one would be inadequate for the other. Let us analyse these conditions.

To take a street scene we assume the camera to be so placed as to command a view up or down the street; the centre of the picture is therefore situated at a greater distance than the sides, which rapidly approach nearer to the lens. Now, what is to be noticed here is that the scene to be depicted is not stretched out before the camera in a fine, straight sweep; hence, if a lens were so corrected as to project upon a flat plate a view of the latter character, it would be imperfect when applied to the delineation of a converging view, because, according to the law of conjugate focus, the portions of a picture which are nearest to the lens have their images formed at the greatest distance behind it. If, therefore, a lens were so corrected as to bring to a focus on a flat plate a view the sides of which were at a much greater distance from the point of sight than the centre, it is obvious that the nearer these sides were brought to the lens, the centre remaining unaltered, the more out of focus they would become; for, the anterior conjugate focus being reduced, the posterior must be lengthened in a corresponding degree, and if the ground glass be not moved back there will be no sharpness in the picture. Hence a lens that has been corrected for flatness of field, distant objects being assumed, is not perfect when applied to the taking of such a subject as a street, the interior of a church, or any subject, in short, in which an oblique pencil throughout the lens has its outer conjugate—that is, the object to be delineated—a great deal closer to the lens than the subjects directly in front of the lens, which are reproduced by the axial rays.

The above is the law referring to lenses corrected for flatness; but it bears so directly upon lenses giving a round field that a few words only will be required to point out its application to them.

It is admitted by every optician that the perfection of marginal definition can only be obtained in conjunction with a round or, rather, a hollow field. But as no one cares to take his photographs on the inside of a bowl or a watch glass, and as all display a marked preference for flat plates, the flat plate must be accepted as the primary element in the data on which opticians must construct their lenses. They have to secure flatness with as much sharpness and as little astigmation as possible; and to do this is attended with great difficulty, calling forth the highest powers of the optician. It may be considered as an axiom that in proportion as the focus of the oblique pencil exceeds that of the axial one so does astigmation increase.

From this we learn that, if a lens be properly corrected for flatness of field, it will be of all others the most valuable for reproducing objects on a plane surface, such as maps, engravings, and similar subjects. It will also be by far the most valuable kind of lens for landscapes and architectural subjects, and, indeed, for everything likely to be depicted by photographic means, with the exception of those subjects in which the sides and foreground approach near to the camera, such as streets and interiors of churches. For these a lens giving a round field will be best. It will also answer well for landscapes if the artist consider it good taste to give to the unimportant objects usually lying scattered in the foreground of a picture a degree of sharpness which, superadded to the necessarily large scale on which they are produced, scarcely fails in being somewhat offensive.

But even with a lens perfectly corrected for flatness it is not only possible, but it is a comparatively easy matter, to render the foreground quite sharp, if that be desirable. When the camera (and the effect to be described is most noticeable when a lens of long focus is used) is pointed to a view, and the focus made as sharp as possible, no matter how perfect the lens the immediate foreground will be indistinct from its being out of focus. But to equalise the definition all that is required is to "swing" the camera back in such a way as to withdraw the upper part of the ground glass from the lens, when immediately every object becomes sharp. The central portion, and all along the horizontal line of the picture, previously quite sharp, does not suffer in the slightest degree; while the foreground, which recently appeared blurred, becomes crisply defined. It is a case of gain secured at the expense of no loss.

LONDON PHOTOGRAPHIC SOCIETY RESULT OF THE PLEBISCITE.

We have to announce the last effort of this Society to rehabilitate itself. Last week we recorded the disorder prevailing—how that everybody would resign, that nobody would take office, and that all shirked responsibility—and how that, after a sober endeavour to form an executive according to law and order, a sudden fit of lawlessness seized a few members, and, instead of obeying their laws, they determined to adopt a *plebiscite*—an universal appeal to the members—to name and elect by the same action whoever they chose for President, Vice-Presidents, and members of Council. A committee of seven was appointed to carry this out. During the week this committee issued a list of some three hundred names—including honorary members who are not entitled to vote, non-resident members who could not possibly be communicated with in time, and persons who disclaim being members at all—for the members to pick out of the entire number the names of those whom they would choose to fill the various offices in the Society. The committee, however, assumed the power to make a selection of whom they thought most proper to be elected by printing certain names in italics and recommending them.

Accordingly on Tuesday little more than a score of the members assembled to hear the result of this illegal, irregular, haphazard scramble for office. Two-thirds of the members appear to have treated this unsolicited appeal with contempt, for they declined to recognise the *plebiscite* by not returning the prepaid envelopes. About one hundred did send in their marked lists, and the result of this rough-and-tumble election is amusing. There were no fewer than *thirteen* Presidents proposed, about *twenty* Vice-Presidents, and as many as *eighty* members of Council.

Anything more ludicrous could scarcely be conceived in the way of popular-election-run-mad. The hundred members voting, supposing they were all members, managed to propose no fewer than *one hundred and thirteen* candidates for *twenty-two* offices. The marvel is, when the offices had thus been going a-begging, that so many should be found anxious to fill them. Nearly everybody must have voted for himself, how otherwise could eighty candidates for the Council be found out of a hundred voters, to say nothing of the thirteen Presidents and twenty Vice-Presidents. After all there is a little modesty left, and it was only one-third out of the whole number who voted for himself to fill the positions of President and Vice-Presidents.

After a laborious enumeration of more than three hours, the names of the members chosen for the doubtful honours were announced. We are bound to say that in this haphazard fashion some of the best members of the Society were at the head of the poll, though many equally good had, in the scramble, been omitted.

The result of the *plebiscite*, as such, is a failure. The only value it could have had as an appeal to the members, above and beyond the laws, was to receive a verdict of the members as a whole. But when only a considerable minority takes part in the proceeding the value of the entire affair falls to the ground. The gentlemen, therefore, who are elected hold such dubious authority that at best they can only be considered a "provisional government." They are in office contrary to the laws of the Society, and are elected only by a minority, as the highest votes for any one is not one-quarter of the number of the voting papers sent out.

These gentlemen must remember, also, that, in addition to the irregular conditions under which they take authority, the manner in which the voting papers were sent out is open to grave suspicion. Many papers were received by persons to whom they should not have been sent, and others were filled up and delivered by persons to whom they were not sent. If voting papers be in future adopted some better plan must be chosen to prevent the whole thing degenerating into a farce. In the recording of the votes, also, serious objection must be taken to the method adopted of adding votes to the Vice-Presidents which were given for President; in like manner adding votes given to the Vice-Presidents to swell up the amount as Councillors.

Under these circumstances it will be the duty of the persons thus in office—it would be an abuse of words to call them elected—to at once proceed with the least delay in getting the laws amended, to enable a genuine election to be held which will relieve the office-bearers from the opprobrium of illegality under which, until that time, they must certainly remain.

ON THE METHOD AND CHEMISTRY OF APPLYING ALBUMEN AS A SUBSTRATUM.

Some little discussion has been raised by the remarks of our valued correspondent, Mr. M. Carey Lea, upon the desirability of using albumen as a substratum. We have been induced to return to this subject because it is one of great importance. It means to the working photographer time, and time means money. It gives him a facility in the execution of his business operations difficult of appreciation except by those who have worked with it.

The usual method of using albumen as a substratum has been described in our article upon this subject published on the 17th ult., and the method of which we are about to present details is given upon the authority of a practical man who has used the albumen for many years. His remark was—"There is evidently some diversity of opinion upon the relative desirability of using albumen as a substratum. If they use acetic acid and not ammonia, as I do, there will never be any diversity of opinion. I," continued our informant, "once used ammonia, and the results were sometimes uncertain; the ammonia seemed occasionally to produce fogginess and bad negatives without any apparent cause, but I have never been troubled since I used acetic acid." It is just possible that the freshness of the albumen may have something to say to this question; in fact, that the action of the ammonia may be different with different states of the albumen. Take the sulphur of the albumen, for instance. A slight chemical change in the white of the egg may result in the formation of a sulphur and ammonia compound, which produces fogging and other bad results.

Thus albumens from different sources exhibit different properties, and this is shown in a marked way as regards the manner in which the sulphur is tied in the molecule. Thus blood albumen, when boiled, does not give up any of its sulphur (sulphur is a component part of albumen) as sulphuretted hydrogen, but most of the egg albumens do; and this is most marked in those eggs which are a little stale. Who has not observed the different character of the white of a fresh-laid egg from that of a stale one? Even its physical appearance is not the same.

As we are on the subject it will be interesting to go a little farther into the chemistry of this substance. Its composition may be given as being that formulated by Lieberkühn, namely—

$$C_{72}\ H_{112}\ N_{18}\ S\ O_{22}.$$

This highly-organised, or built-up, compound, as we may term it is easily changed or decomposed, its complexity forming a source of fragility. The above composition is based upon the centesimal composition obtained in the analysis of egg albumen, and blood serum gives almost identical results:—

Carbon	53·3
Hydrogen	7·1
Nitrogen	15·7
Oxygen	22·1
Sulphur	1·8
	100·

Now, although the above composition is very constant—in fact, we may say, represents the composition of albumen from all sources —there is reason to think that this substance, as met with, is a mixture of two or more compounds. Thus, according to the experiments of Lebonte and Goumoens, albumen is a mixture of two bodies—one of which is soluble in acetic acid, whilst the other is not. The soluble modification is precipitated by potash unchanged. And, again: the general properties of albumen vary very considerably with the source from which it is procured.

An albumen has been obtained in the human body which is not precipitated by ebullition, and is dissolved by water after being precipitated by alcohol. Another variety from the same source gives no precipitate with hydrochloric acid. There is even a marked difference in the albumen obtained from different tribes of birds. The characteristics of albumen, as generally described, are those found to appertain to the gallinaceous birds; but the albumen of waterfowl, when diluted with three parts of water, is not coagulated by heat—it is, however, coagulated by nitric acid—whilst the albumen of predaceous birds (birds of prey) is neither coagulated by heat or by nitric acid; yet, as far as we can yet tell, there is no difference in the chemical composition. It must, however, be borne in mind that the white of egg is merely a solution of albumen with many other substances, and that the fact of it coagulating into a solid mass might give a very exaggerated notion of the amount of albumen present. It is really a very weak solution, as will be seen below; and the small amount of albumen present really forms but a proportion of the solids, which must, in a great measure, play a very important part as regards the chemical reactions. The white of the egg, besides free gases, contains fat, sugar, indefinite extractive matter, and a considerable quantity of free salts.

The following are Lehmann's figures, representing the composition of ordinary poultry eggs:—

Water	82 to 88 per cent.
Albumen in combination with soda	12·5 „
Other extractive matters (containing a small quantity of fat and sugar).	3·14 „
Insoluble phosphates	·13 „
Soluble salts	·68 „

The composition of the ash particularly bears upon the photographic question, and forms a large percentage of the dried residue. It averages from three to eight per cent.

The centesimal composition of the ash of poultry eggs is as follows:—

Chloride of sodium ("salt")	8·57
Chloride of potassium	25·67
Potash	5·43
Soda	12·40
Lime	6·25
Magnesium	2·09
Peroxide of iron	2·09
Phosphoric acid	15·28
(acids calculated as anhydrides).	
Sulphuric acid	0·84
Carbonic acid	9·01
Silica	7·05

It will be observed that the chief characteristics of this ash may be given as follows:—The white of the egg has the most complicated composition as regards its mineral constituents, and so far differs from the yolk, which is only rich in phosphates. It is, in fact, the supply of the undeveloped chick as regards mineral foods. It may be remarked, therefore, that the white of an egg is a solution of albumen proper ($C_{72} H_{112} N_{18} SO_{22}$) with a large proportion of chloride of potassium and sodium and free soda and potash, because the amounts of fixed acids are not sufficient to saturate the alkaline bases.

We must reserve our remarks upon the application of albumen until next week, as these details have extended to a considerable length, and are yet important in understanding the methods of applying albumen.

WESTON'S ROTARY BURNISHER.

The combination of heat and friction to the surface of photographs, now beginning to be recognised as "hot burnishing," appears to bid fair to become one of the institutions of this country. Although only a few months have elapsed since the "hot burnishers" of the Weston model were first imported from America, there is no mistaking the fact that they are rapidly acquiring popularity and are daily growing in favour.

In November last we gave a drawing and detailed account of Weston's rotary burnisher, to which we refer those who are desirous of becoming acquainted with its mechanical details, as well as with its claims as an useful photographic adjunct which has secured the protection of a patent. This invention is now being largely introduced into this country by its proprietor, Mr. Joseph P. Bass, of Bangor, Maine, U.S., who is at present in London with a view to establishing agencies for the sale of the burnisher. This he intends doing through the means of a few "head centres," such as Messrs. W. W. Rouch and Co. in London, Messrs. Mason and Co. in Glasgow, Mr. J. J. Atkinson in Liverpool, and soforth.

We have seen, at Messrs. Rouch and Co.'s, the rotary burnisher in operation, and find that its action is exceedingly simple, while the surface which the print acquires after being passed through the machine partakes of the character of that of a fine enamel. Hot pressure rollers have long been known as providing the means of imparting a far greater amount of smoothness and finish to a photograph than could be obtained by plain cold rolling; but by hot *burnishing* there is not only smoothness but a high degree of glossy polish imparted, the result of friction, under a very powerful pressure, against a polished and rounded rib of hot metal.

A few months since a Parisian came to this country to take orders for burnishers nearly similar to those of Weston, and succeeded, we understand, in disposing of several. There are two points in these French burnishers to which it is desirable to draw the attention of our professional readers. The first is this—the burnisher in the French ones is made of highly-tempered polished steel; but as steel, no matter how hard it be tempered originally, soon becomes permanently soft—nearly as soft as malleable iron—under the protracted heat to which rotary burnishers are necessarily subjected its efficiency rapidly declines, and scratches are apt to result. Weston uses a very hard alloy, which is not affected by heat. The second point is one of even greater importance. The French rollers being direct infringements of the Weston patent (the specification of which will be found at page 528 in our volume of last year) any person in whose possession one of the French burnishers is found is in danger of being proceeded against for infringing the patent.

Acting in the interests of some whom we know to be daily engaged in using the pirated invention we have made inquiries from Mr. Bass as to his intentions with respect to those who have, by purchasing an article having no legal *locus standi*, unwittingly done injury to the inventor. He replies that he is disposed to treat these unintentional "sinners" with the greatest liberality—namely, to request each to pay a small royalty for the use of the machine. This will entirely meet the justice of the case.

Among specimens we have received from Mr. Bass, and which were finished by the burnisher, are some charming portraits taken by Mr. Weston himself, who, we are informed, is an amateur photographer. His artistic work reflects the highest credit upon that gentleman, both the lighting and the photographic treatment being of a high class as respects arrangement and manipulation. Two portraits—one representing a young, fair, blooming daughter of America, and the other one of that country's old weather-beaten sons, rugged, wrinkled, and devoid of any semblance of adipose tissue—are capital specimens of Mr. Weston's work. A portrait of a little fellow of three summers, rejoicing in his first pair of knickerbockers, equally stamps Mr. Lamson, of Portland, Maine, as a very able photographer, while it is only necessary to say that some specimens by Mr. Notman, of Montreal, quite sustain the reputation of an artist with whose name our readers have long been familiar.

From the results of trials made on pictures supplied by ourselves we arrive at the conclusion—which may, however, afterwards be qualified—that in order to secure the highest attainable degree of gloss and polish it is necessary the paper should have been strongly albumenised. The best picture among all those glazed by the Weston burnisher which we have yet seen was one supplied by ourselves in order to test the full capabilities of the machine. It was printed upon double albumenised paper; that is to say, paper in which the first coating of albumen had been coagulated by steam, and which thus became a substratum for the second or printing layer of the same material.

It will afford us pleasure to see these burnishers generally adopted.

PHOTOGRAPHS AT THE INTERNATIONAL EXHIBITION.

[Third Notice.]

Has the series of International Exhibitions proved a total failure? Whether this be the case or not one thing is evident—the Commissioners have decided that instead of being carried on for a prescribed number of years agreeably with the programme originally decided, they shall terminate at the close of the present Exhibition; hence the 31st of October will see the project abandoned.

We need not here pause to inquire what causes have operated to bring about such a collapse. Speaking from a photographic point of view, it is not at all difficult to account for the apathy bestowed upon the collection—at least by photographers. "Who would waste time," said one in our hearing, "to go and see a lot of old photographs that were more than thoroughly examined at last year's photographic exhibition, and which stare at you from every printseller's window?" This, although only partially true, really expresses the feelings of many photographers and photograph-*fanciers*. It is only partially true, because, although the majority of the pictures are "old" in the sense referred to, all are not so. The photographic collection the first year was exceedingly good; but each year since it has been rapidly waning in interest—in some respect or other the result of mismanagement.

We have now done with fault-finding, and resume our notice of the pictures.

It is a common failing with many who take portraits in the "Rembrandt" or shadow style to overdo the effect, and to produce pictures arresting attention merely from their patchiness. Every person is aware of the kind of illumination produced when a sitter is placed at one side of the only window in a private room, the spectator being at the opposite side of the window, and close to the centre of the room. This description of effect is much more striking than artistic; but it is precisely that which is too often obtained by some who aim at abnormal and sensational effects in lighting. The whites are patchy and eaten up, as it were, no detail being visible; while, *per contra*, the shadows are heavy and unnaturally black. Of pictures of this kind there are several in the Exhibition, and three exhibited by Mr. Boucher partake of such a character. We the more willingly select pictures by this artist for the purpose of illustrating what we consider a defect, because he has several others which are not only entirely free from it, but possess very high merit—not, indeed, inferior to any in the Exhibition.

Signor Lombardi exhibits largely, his portraits being, as usual, very carefully executed. Of these *The Speaker* (4354) is a favourable example.

Day Dreams, by the Misses Davison, is an artistic presentment of a semi-dressed lady looking down with wistful eyes upon what *appears* to be a shattered bunch of grapes, evidently suggestive of the pleasures of the preceding evening, the incomplete recovery of the fair one from the consequences of her "pleasant dissipation" being perceptible in her woebegone looks, dishevelled locks, and that generally-undefined appearance which, in one of the male sex, would be associated with "seediness."

As a specimen of colouring, Mr. Perkins's picture (4369) is peculiarly excellent; but this work, together with two coloured portraits of children by Miss Emma Cooper, Mr. Crawshay's *English Gentleman*, and several other pictures have, unfortunately, been hung upon a wall close to a window, necessitating the eyes of the spectator being wellnigh blinded by a powerful flood of south light.

Mr. Earl contributes some very fine pictures of curlews, mallards, guinea fowls, and wild ducks. These are nearly lifesize.

Although in our opinion Mr. Crawshay has not surpassed his portrait of *Dr. Diamond*, to which we referred last year, there are, notwithstanding, among his portraits of ladies some which approach very closely to it in excellence. Among these we might cite *Reverie* (4451) as being a very charming picture.

Mr. F. M. Sutcliffe—a young artist whose works at the London Photographic Society's Exhibition enabled us to speak of his artistic efforts in terms of commendation—exhibits several capital pictures, amongst them being *The Wizard's Glen* and *A Cottage in the Wood*.

Colonel Stuart Wortley, Messrs. Robinson and Cherrill, Mr. Blanchard, Messrs. A. and J. Bool, Mr. Cocking, and others exhibit more or less largely; but most, if not all, of these artists, and also several other exhibitors, show works with which that portion of the public who admire photographs have already made acquaintance under other circumstances.

COLLODIO-BROMIDE WITHOUT FREE SILVER.

I THINK the whole photographic world ought to thank Mr. M. Carey Lea for his investigations in emulsions. There is no doubt that his application of the mineral acids to the preparation of emulsions containing free nitrate of silver was the discovery which first made rapid dry plates really practicable and reliable; and, whatever new methods of preparing them may be discovered, his will remain, in my opinion, the simplest and, in most respects, the best for general use. In all my own investigations I have used his formulæ as a starting point, and once for all wish to render him this credit.

But that the office of the free nitrate has been greatly misunderstood is apparent from recent experiments I have made with a view to preparing an emulsion capable of long keeping without losing its good qualities. I have, for instance, prepared an emulsion with the largest quantity of free nitrate which it would carry, using nitric acid as a restrainer, and, after preparing a batch of plates, converted the whole of the free nitrate by the addition of a large excess of bromide, and then prepared more plates, and no perceptible difference in the sensitiveness of the two lots was produced. A third batch, made from an emulsion prepared with excess of silver at the outset, and without nitric acid, the excess being afterwards converted, was equally sensitive with the others.

It is, in fact, seriously to be doubted if free nitrate can remain in a washed place. I recently prepared an emulsion by precipitation of the pyroxyline and bromide of silver in water and re-solution in alcohol and ether after thorough washing. I added to this a trace of nitrate of silver, and the films blackened from the addition of one grain of salicine per ounce of emulsion, while a film washed only until water would flow over it, though it was highly charged with nitrate, on being poured showed no evidence of it on application of a concentrated solution of tannin or sulphate of iron. These results set one thinking on the office of the free nitrate.

The value of the hydrochloric acid in giving density is inconceivable, but it most certainly does diminish sensitiveness. I prepared some months ago a stable emulsion, of which I sent a bottle to Mr. Mawdsley, who prepared from it some plates, and at the same time some by his own process and some by Mr. Lea's. These he sent to me, with private marks unknown to me, for exposure and development. On comparison he found the plates made from my own emulsion much more rapid than either of the others. For sensitiveness to feeble radiations there was no comparison between them. Yet my emulsion had two grains per ounce excess of bromide of ammonium.

In spite of all drawbacks, I still look to an ultimate perfection of the emulsion process as the great desideratum in dry-plate photography; and some of my recent experiments encourage me in the hope that we may secure an emulsion which shall have indefinite keeping qualities and require neither washing nor preservative.

W. J. STILLMAN.

EMULSIFYING BROMIDE OF SILVER.

IN compliance with your request in last week's Journal to give information as to making an emulsion from bromide of silver direct, I would remind Mr. Berkeley that such an emulsion has to be made like a Mayonaise sauce—gradually, and with much stirring.

The most convenient way is to place the bromide in a mortar, and gradually incorporate it by stirring into the collodion little by little. The mere shaking up of the two substances is of no use. Clots and lumps are sure to remain persistently in the emulsion, and no shaking will get rid of them. H. STUART WORTLEY.

MOIST FILMS.

I HAVE just received the following letter from a gentleman residing at San José de Flores, near Buenos Ayres, putting certain questions respecting moist films, which he requests me to answer either by private letter or through the medium of this Journal. In the latter case (which I shall adopt because my remarks may perhaps be of use to others) I am to suppress his true name, and address him under the *nom de plume* of "Buenos Ayres":—

SIR,—I take the liberty of writing to you a few lines regarding moist films, as I have been much interested in the question, and have read carefully all you have, from time to time, published in THE BRITISH JOURNAL OF PHOTOGRAPHY during the last year. I have made several trials in this direction and am very anxious to succeed, as I know that certainty in working the process, if I could achieve it, would to me be a great boon in many ways. If you would, therefore, kindly answer the questions I append, either through the medium of the

Journal or in a private communication, you would do me a great kindness. I shall, to save trouble, number them and keep a copy by me, so that if you place the corresponding number to the answer I shall at once have it before me. I will not detail the experiments I have made; suffice it to say that some have been tolerably successful and others the reverse. Some difficulties I have conquered, others I have still to master. I have no doubt most of them may be accounted for by my inexperience in making collodion, and small practice in development with pyro., either acid or alkaline. I think, however, that most, if not all, obstacles would be cleared by answers to the following questions.

I made the collodion as follows (materials all of Poulenc and Wittmann):—

Cotton	*Quant. suff.*
Ether (62°) and alcohol (40°)	Equal quantities.
Iodide of cadmium	4 grains per ounce.
Bromide of cadmium	3 ,, ,,

I poured three-fourths of the alcohol on the cotton, shook it, added the ether, shook well, then the salts dissolved in the remaining fourth of the alcohol. This, on being poured on glass, dried opalescent, and something like ground glass. Hence, here is my first question:—

1. Ought the collodion to dry clear?

2. If so, in what do you think my failure in making the above consisted, for plain collodion dried quite clear made from same materials?

3. What should be the proportion of ether to alcohol of the above strength?

4. Is the above strength right?

5. Would glycerine added to the collodion be beneficial? I ask this because I added it to the collodion, and found that six drops per ounce had the effect of making the collodion dry clear. I did not risk a trial in my bath.

6. What addition of bromide to Mawson's or Thomas's collodion would suit them for the slow process (if at all)? I tried two grains per ounce with some success.

7. What strength of pyro. developer do you recommend?

8. Ought a plain pyro. developer to bring out an image without the addition of silver?

9. Should the collodion be kept any length of time before use?

10. Should it be colourless? What I made is quite colourless, after having been made two and a-half months.

11. Is a substratum for 10 × 8 plates necessary? If so,

12. What substratum do you recommend?

I think with answers to the above I ought to succeed pretty well, and perhaps (if I have time to experiment) before I receive them I may have made some better attempts than previously.

From the above you will see that my chief difficulty seems to lie in the collodion. I am by no means sure, however, that in most cases I have not come to grief in the development—perhaps added too much silver, or too little acid, or both. As yet I have not had time to try an alkaline development; but I shall do so as soon as possible. I mean also to try the purely-bromised films with an eighty-grain bath; but I should like to make sure of my materials first, as I have not much spare time for experimenting. I have your pamphlet on the subject and nearly all the articles which bear upon it in the Journal, and I must say that it looks very tempting. Especially so is the rapidity you claim for it, not to mention the convenience of dispensing with all the *impedimenta* of the wet process, which to me, who do a good deal of landscape work in a country where labour is dear, is no mean consideration.

I must apologise for troubling you with such a lengthy communication. If you can find time to answer my queries I shall be most sincerely grateful, and nothing would give me greater satisfaction than to send you a few prints from good negatives as the result of the (anticipated) kindness you will do me.—Yours, expectantly, BUENOS AYRES.

P.S.—Since writing the foregoing I have made another trial with the same collodion, but failed. First of all, I made a negative in the common wet way, developing it with iron, and using a thirty-grain bath nearly neutral. It was perfectly clear in the shadows and good in every respect. The exposure was about the same as I would have given with the collodion (Mawson's) which I have in ordinary use for portraits. I concluded, therefore, that I might with reason expect a good result from a moist film. After removal from the nitrate bath I washed the plate in two baths of boiled and filtered rain water, then in a third bath of the same water containing about a teaspoonful of table salt. I then washed it well with common well water, finally pouring about a pint of the boiled rain water over it, and then applying the preservative—albumen, two parts; glycerine, one part; water, five parts. The plate was then allowed to drain for half-an-hour in a closed box free from dust. About two hours later I exposed it, and subsequently, after another hour had passed, proceeded to develope it. I made a three-grain solution of pyro., and added one and a-half grain of citric acid per ounce, put this in a dish (about sufficient to cover the plate), washed the plate for about a minute in a dish of boiled rain water, and then immersed it in the pyro. I kept moving about the dish for about half-a-minute, then removed the plate, and intimately mixed four or five drops of a solution of thirty grains nitrate of silver and two drachms acetic acid. Shortly after the image began to appear the negative fogged badly.

I repeated the same experiment with Thomas's collodion, to which I had added two and a-half grains per ounce of bromide of cadmium in a little alcohol, but with the same result. I had never failed before so terribly. I had likewise never used the salt washing. Was this the cause of my failure? This afternoon I shall omit this, and see if a better result will happen. I am as certain as possible that white light had nothing to do with it, and I had used the same development previously with tolerable results. My usual mode of development was to add the silver with extreme caution, a drop or so at a time; but for the most part I ultimately landed my negative in fog. I have produced negatives loaded with delicate detail, but most of them more or less fogged. I have an idea that I spoiled most of them in developing. As yet I have never made a perfect negative. I may state that I can take a good negative with the common wet process, and when I fail I can almost always find out the "why."

I believe my pyro, &c., to be of good quality; but as I am by no means *au fait*, as I said before, in this method of development I am naturally very dubious of success when I employ it.—B. A.

The following are my answers to the various queries:—

1 and 2. Collodion iodised with the cadmium salts only always dries opalescent, although the same *plain* collodion may dry clear. When the collodion is iodised with the ammonium salts it dries clear. There is no disadvantage whatever in its drying opalescent when iodised with the cadmium salts, because all the salts of cadmium are ultimately removed from the film.

3 and 4. I always use ether at 65° instead of at 62°, because it is certain to be purer. Try your own collodion in the common wet process with the iron developer. If the negative, when dry, does not show crapy lines (rows of transparent dots or cracks) in the blacks, the collodion does not contain too much water. If your negatives show crapy lines of transparent dots, increase the proportion of ether to alcohol, or re-distil the latter with quicklime in order to reduce its specific gravity. Your proportions of iodide and bromide are very good for washed films. Your own collodion is probably good, and I do not think your failures are attributable to it. I should have more confidence in it *for this process* than in the collodions of Mawson or Thomas, because the latter are made by secret formulæ, and we do not know what they may contain.

5. Do not add glycerine to your collodion. I have not yet carefully studied its effects, but I am certain that you ought to get good results without it.

6. Collodion for moist plates ought to contain at least three grains of bromide of cadmium per ounce. The way to judge how much bromide any collodion contains is to coat a plate with it, and immerse it for several minutes in an eighty-grain nitrate bath. This will dissolve out all the iodide of silver, but will leave the pale white bromide film. The density of this will give you an idea of the quantity of bromide in the collodion.

7. Water, one ounce; pyrogallol, two grains; acetic acid, forty minims. Never use citric acid in the developer.

8. It ought to bring out a very faint image, if made with distilled or rain water. If made with well water containing salt it will *not* bring out an image. If the well water contain alkaline or earthy carbonates, and no salt, the plain pyro. will bring out a feeble image.

9. It will be better if kept for a fortnight, and then drawn off clear; but, if the cotton be perfectly soluble without any sediment, the collodion may be used at once. Good collodion, iodised with the cadmium salts only, will keep for years; but these salts tend to make the collodion gelatinous, unless a very fine special quality of cotton be used, and that is why many firms iodise with the ammonium salts, and send out the iodiser separate. Their collodion, when iodised, takes a deep colour, and gives less sensitive films after it has been kept a few weeks. It is troublesome and costly to make pyroxyline with fresh acids, at a high temperature, suitable for the cadmium salts, and that is why such collodion is dearer and not commonly employed.

10. Cadmium-iodised collodion ought to be very nearly, if not quite, colourless.

11 and 12. No substratum is necessary for moist films.

It appears to me that your failures described in the postscript do not proceed from the use of your own collodion, but from organic matter in your washing water, or from fatty acids in your glycerine, or from too much silver in your developer, and a wrong mode altogether of using the pyrogallic developer.

Do not boil the rain water. Use it cold, and filter it through some wood charcoal.

Try a plate without any glycerine, but merely an organifier of albumen one part, water two parts, and expose it at once as soon as it has drained. Develope the plate by holding it in your hand by one corner. Add to one ounce of acid pyrogallol, made as in my reply to question 7, four or five drops of a freshly-made thirty-grain solution of nitrate of silver. Having washed off all the albumen pour this over the plate. Wait patiently, letting it flow backwards and forwards up to all the edges and corners, and in the course of a minute or two the high lights will come out faintly. Now add four or five more drops of silver; and, with plenty of patience, this will probably in a few minutes complete the development. The lights will be as clear as crystal, and the blacks a beautiful non-actinic, yellowish-brown. Give a long exposure, and be very patient over the development. Do not develope in a dish; and do not begin without silver, because the acid pyro. destroys instead of developing the image. Use acetic, and not citric, acid in the developer. In order to familiarise yourself with the pyrogallic development use the pyro. developer, without silver added, instead of iron, for a common wet plate made with your own collodion.

When you have perfectly mastered the development with acid pyrogallo-nitrate try the alkaline developer, and you will find that the time of exposure may be reduced to one-half, and a more harmonious negative obtained.

Do not use the rapid bromide process for ordinary views; use it only for portraits and instantaneous subjects. There is more blurring in this process, and, for that reason, it is not so good for subjects which exhibit strong contrasts of light and shade.

The fogging of your plates may, perhaps, proceed from your leaving them too long in the nitrate bath. In a hot climate the coating of bromo-iodide of silver is very quickly formed, and if the whole of the soluble salts be converted, and no trace left of unconverted bromide, the films are very liable to fog. In Buenos Ayres, during the summer, an immersion of one minute will probably suffice. The bromide process works much better in cold than in hot weather, and I have found that, during the height of summer in France, plates which were prepared at five o'clock in the morning worked well, whilst those which were prepared with the same materials and in precisely the same manner at noon, when the temperature was up to 90°, gave feeble or fogged negatives. The key to this process—as Major Russell has always truly said—is to leave a trace of unconverted soluble bromide in the film. Another point to attend to is to remove every trace of free nitrate from the film before organic matter is applied to it; therefore the washing water should be free from organic impurities. Boiling it in a vessel of questionable cleanliness may, perhaps, have been one cause of your troubles.

You have added too much water to your organifier. This would dilute the glycerine so much that your films would probably be nearly dry instead of moist. When you have succeeded with plates organified with albumen only, without glycerine, expose, as soon as they have drained, upon test objects close at hand, and develope immediately. Then take another step onwards and add the glycerine, and try how long they will keep. Everything new has to be learned step by step, and the quickest way of mastering a new process is to learn it in the rational way which I describe. Work for a few days with small plates upon test objects close to the studio, and do not sally forth to take views until you are sure of what your are about. Every failure must have been encountered and its cause understood before one can be master of a new process. One cannot jump at once to invariable success.

I do not yet know how long moist plates will keep, but I think it is quite possible that they will keep long enough to supersede dry plates for a tour of a month's duration. If so, it will be a great gain to us, because they do not require a preliminary coating or a red backing. The only cause of their deterioration by keeping would be that the organifier would begin to decompose and putrefy, on account of the presence of moisture; but I have great hopes that this may be prevented by the addition to it of a little carbolic acid (or, more properly, phenol, since it is not an acid), as suggested by Mr. P. Le Neve Foster. I have now by me a solution of gelatine and glycerine made last July, which contains the one-thousandth part of phenol, and it is still quite sweet and works beautifully.

The moist process is full of interest from its being a simplification of the dry process, and there will occur in everyone's experience cases in which it may be employed with great comfort to the operator. The plates may be either slow for common views or rapid for instantaneous subjects, and it is pretty certain that they will keep good for several days. I am not at all sure that when phenol is added to the organifier they will not keep good as long as dry plates —that is to say, for twelve months. If so, there will be an end of the dry process; for it is an immense advantage to be able to get rid in this way of wrinkling and blistering of the film, and also of its loss of opacity on drying, which renders the red backing necessary. One thing is certain: if a plate will not work well moist it will not work well dry, for it does not gain any good qualities in drying; on the contrary, the drying of the film is a disadvantage from every point of view.

It has been thought that a moist film would collect dust, but that I find, practically, to be a mistake. There are not more dust specks upon my own moist-plate negatives than upon my ordinary wet ones; whilst most of my dry-plate negatives are unpleasantly troubled with them. Dust seems to attach itself to the film during the process of drying, and to become so firmly embedded in it that it cannot be washed off. It is a nuisance peculiar to dry plates.

THOMAS SUTTON, B.A.

EXPERIENCES IN PRODUCING NEGATIVES IN PLUMBAGO.

BLACKLEAD—a substance hitherto only associated with fire-grates and stoves—is about to play an important part in photography, and will soon be one of the most useful articles the photographer possesses.

It is now some eight or twelve months since Messrs. Geymet and Alker, of Paris, published a small work on the collotype processes, in which ample directions were given for producing a reversed negative by the use of plumbago. Extracts from this work were published in our journals; but, like new things I suppose, very few people took the trouble to try it, and it is only now, when Herr Obernetter, of Munich, has received a gold medal from the Vienna Photographic Society for publishing his process, that the public are beginning to open their eyes to the great benefit of this method over all others.

There are many ways of reproducing negatives—by copying, by contact with wet or dry plates, by carbon, albumen, &c.—but which all require a double process, and there is always a something about them in which the charm possessed by the original negative is lost. Now, in the process of reproduction of the negative direct from the negative, with no positive interference, there is no such loss; in fact, by careful manipulation a negative may be reproduced between a print from which and one from the original, placed side by side, the producer himself could not distinguish the difference. But that is not all. A negative having every detail, but lacking in brilliancy, can be reproduced with the very brilliancy it lacks, and so be very much superior to the original. Again: from a too dense negative one of the right printing density can be obtained. But in these days of what may be termed "fancy" printing, the results of which are only obtained with considerable time and labour, how great is the boon!

Suppose we wish to obtain an oval vignette *carte* on a black ground. This would first involve the careful vignetting of each print, and then the use of a mask to shade the centre while the outside darkens. How much time would be saved were all these requirements found in the negative itself! In the plumbago process this would be accomplished as follows:—The prepared glass would be first exposed under the negative, a vignette glass or other method of vignetting being adopted; the exposed plate would then be covered with an oval piece of black paper, and the outside exposed to light. On developing this picture with the plumbago we should possess a negative giving at one operation all we required, and what would otherwise have taken considerable care in manipulation. By carefully developing from the centre to the outside, a vignette picture similar to those produced in Russia would be the result. But, perhaps, one of the most important uses of this process will be the production of combination negatives instead of combination prints, which means an immense saving of labour, these sort of prints having always represented such an outlay of time as to be necessarily expensive.

One thing to be borne in mind is that in this process things are all reversed, the shorter exposure giving more detail and the longer a hard, chalky effect; but still there is great latitude, as a slightly over-exposed plate may, by being left in a damp place, be made to develope all right.

My first attempts were made some six months ago, on obtaining a copy of Geymet and Alker's work; but the results I got were by no means encouraging. I followed the instructions to the letter, but my results were coarse, showing lines of the brush over the parts that should have been transparent. Having had, however, during a late visit to Germany, an opportunity of seeing some of Obernetter's results, I determined to try again. This time my first trials were very satisfactory; but in this instance I did not adhere strictly to the instructions. I omitted the breathing on the film, and found out that this had been the sole cause of my earlier failures. Let me give the caution to any one trying this process never to breathe on the plate except in rare cases, such as bringing up an under-exposed foreground, &c. It is, I believe, impossible to moisten the plate *evenly* by the breath; it is far better to let the plate remain longer in a damp place until it gets into the proper state.

The solution I used was—

Gum	1 drachm,
Glucose	¾ ,,
Glycerine	10 drops,
Bichromate of potash	30 grains,
Water	2 ounces,

filtered carefully through blotting-paper while warm, and kept in a bottle for use. No cork should be used, but a piece of glass kept on the bottle, as the slightest particle of solid matter getting into the solution is fatal to good results. For the same reason, before coating, the plate must be carefully brushed to remove all particles of dust or fluff from the cleaning-cloth, these particles forming a nucleus which, by the repeated passing over of the brush, forms a black spot in the negative.

I cannot say how long the solution may be kept, but I found it as good after a week as when freshly prepared; and, as the ingredients are so inexpensive and the solution so easily prepared, no trouble need be feared on that score.

One of the difficulties of the process is the tendency of the solution to run away from the glass when inclined to pour off the surplus; and, curiously enough, the more carefully the glass is cleaned the more the solution seems inclined to leave it. Doubtless something might be added to prevent this; but by using the solution warm this is not so likely to occur.

The glass cleaned and carefully dusted was coated with the mixture, and, the surplus being poured back, was held over a Bunsen burner till dry, a piece of blotting-paper being drawn along the two downward sides to prevent the solution thickening at those parts. When dry and still warm it was placed in the frame in contact with the negative, an exposure of between two and three minutes being given in the sun. On taking it out of the frame the plate was left about five minutes, and the plumbago softly applied until the image gradually obtained the required density. It was then coated with a thin, normal collodion and dried, and, when thoroughly dry, placed in a bath of water six parts and hydrochloric acid one part, which instantly dissolved the yellow of the bichromate. When again dried, the negative was varnished and the operation concluded. By this means were produced the negatives I had the pleasure of showing at the last meeting of the London Photographic Society.

There are one or two points I noticed in my short experience which may be useful to those who try the method. First: the plumbago negative should not be developed long enough to appear as dense as the original, otherwise it will print too hard, the deposit being of a more non-actinic nature than that of the silver. I noticed in all Obernetter's reproductions that they were apparently much thinner than the originals, although prints from them were alike.

An underground room is best adapted for the development, the greatest freedom from dust being an absolute necessity.

An exceedingly-fine sample of plumbago is necessary; that which I used was one prepared by Messrs. How for coating electrotype moulds. A very fine sample is also prepared by Mr. Newman, of Soho-square.

Always use a glass rather larger than the negative, as there is a tendency to give the centre an over-dose and neglect the edges.

I have not tried taking the film from the glass to reverse it for ordinary printing, as my aim was to produce a reversed negative; but I apprehend no difficulty would be experienced, a thicker sample of collodion only being necessary. One other advantage in these negatives is that they are permanent, which cannot be said of silver negatives, as so many are found to darken by such printing; and if there be any one substance more permanent than others I think it is blacklead.

Walter B. Woodbury.

AN EFFORT TO OBTAIN PERMANENT SILVER PRINTS.

There is only one objection to silver prints, whether on albumenised paper or not—they are liable to fade. They are very beautiful, and they are comparatively easy to produce, but they do not last.

A French gentleman, M. E. Thierrée *fils*, has asked himself the question whether it be not possible to remedy this defect, and has set himself to try. The result of his trials he gives in a paper in the last number of the *Moniteur*, and we have pleasure in giving a condensed account of his experiments. He does not assert that he has succeeded, but merely claims that his process—which he has used these two years—is an approximation to the desired end. If the end were reached, indeed, it would be the hardest blow to carbon printing that it has ever got.

Two years ago M. Thierrée had to do a considerable printing order—5,000 *cartes* and 500 whole-plates—at a very low price, and the problem he had to work out accordingly was how to turn out perfect prints at small cost to himself. First, he tried a bath of fifteen per cent., and then he reduced it to five, with the addition of double the quantity of nitrate of soda or potash. It was in the middle of June, the weather was warm, and his paper got rapidly yellow. His bath discoloured also, and rapidly diminished in quantity. It was kept up to strength, and the best Steinbach paper was used to no purpose. An attempt was then made with albumenised paper previously coagulated, but the results were not up to his hopes. The sheet was but toleraly brilliant, was of a light yellow hue, like pale india-paper, and that, too, before sensitising. Still the bath did not colour as before, and he could work it without inconvenience at five per cent. The resulting prints were, however, flat.

The idea then struck M. Thierrée to try and work the sensitising and coagulation together, and, after consideration, he adopted the following formula:—

Distilled water	6 ounces,
Nitrate of silver	3 drachms,
Alcohol at 40°	1½ ounce,

and to that formula he has stuck ever since. On this bath the sheet is floated from three to four minutes. It is then lifted carefully by one corner and drawn over a glass rod, so that all the excess liquid is striped back into the bath, after which the sheet is suspended to dry. Drying is thus much more rapid than when the sheet is filled like a sponge, and of the liquid which is in it a fourth part is alcohol. No bubbles are ever formed by this means, giving white spots on the prints, neither has the paper oily-like marks on its surface. The economical value of the forced draining is, of course, great, much more liquid being thus returned to the bath. The solution is originally made twelve per cent. strong, though that is not necessary, and it is worked down to five, after which it is brought back again to the original strength. Whatever strength it be the prints are of an uniform intensity, brilliancy, and richness of tone. The proportion of alcohol is kept up, but not by rule. Smell is the chief guide, and if the paper has always a distinct odour of alcohol it will do. Even in the warmest weather the bath does not colour, the coagulation being absolute.

Consequently, this is the chief point—there is no fear of sulphurisation from the silver bath. M. Thierrée thinks that the weakest bath used has silver enough in it to transform into chloride of silver all the salt contained in the sheet, and to convert a portion of the albumen into albuminate of silver. The paper, too, drained as it is, keeps a much longer time white than under ordinary circumstances—a fact easily explained when it is remembered that the coagulated albumen helps to debar the liquid in any case from contact with the sizing in the sheet. The plan has no perceptible influence on the toning. The toning formula used is double chloride of gold and potassium and chalk—the formula of M. Davanne—and the most varied tones can be obtained at will.

The saving which this system involves is very great. To print the quantity named above (and taking into account waste and spoiled sheets) M. Thierrée used 266 sheets of paper, about nine ounces of nitrate of silver, or about fifteen grains per sheet—about a third of the quantity which would have been requisite under ordinary circumstances when a bath of twelve to thirteen per cent. was used. This difference is, of course, partly compensated for by the larger residue returns in the latter case, but not wholly so.

To sum up: this consolidation of the albumen film, which is the sole sustainer of the image, maintains the volume and the purity of the nitrate bath, promotes rapid drying and the lengthened keeping of the sensitised paper, together with economy of nitrate of silver, and has no corresponding drawbacks, as M. Thierrée, after two years' practice, can testify. The editor of the *Moniteur* bears his testimony to the excellence of the prints sent along with the memorandum.

NOTES FROM THE NORTH.

A Visit to Asher's Studio.—Gelatine Pellicle.—Hardening of the Gelatine of Carbon Prints.—Sale by Weight or Measure.

An examination of the show-cases of most of our local photographers shows unmistakably that the so-called "Rembrandt" effects are at present high in favour. Whether or not the effects are in keeping with the requirements of high art is not for me to say, but there can be no doubt that some of them are very beautiful; and as Mr. Asher, of Antigua-street, was the first to introduce them in Edinburgh, and has at present few equals in their production, it occurred to me that a brief description of his studio and method of operating might be interesting to the readers of this Journal. With that object in view I, a few days ago, "interviewed" him, as our American brethren say, and now proceed to describe to my readers something of what I saw.

Mr. Asher, like all good workers, receives his visitors—even those of an inquisitive turn of mind—with a most courteous welcome. His reception and show-rooms are entered directly from the street; they are well stocked with specimens of his work, both plain and coloured. The studio is on the same level, is "oriented" east and west, measures 27 × 39 feet, and is painted throughout a dark brown or chocolate colour. The first thing which strikes the visitor on entering is the apparently small quantity of glass in so large a room, and the very little even of that which seems to be used. The top light is in the centre of the north side of the roof, and measures 9 × 14 feet, and the side light 4 feet 9 inches × 14 feet, commencing at a height of two and a-half feet from the floor. This is covered by heavy blue curtains, which are made to slide easily and admit less or more light—in his case generally less—as may be desired. The top light is shaded by a number of square wooden frames, on which is stretched yellowish-white calico. These lie on parallel cords under the glass, but at a much less angle than the slope of the roof, and can be pushed backwards and forwards so as to produce the required effect.

In a story published some time ago in one of the weekly or monthly serials there was an interesting character introduced, a "Mr. Wheels," who spent his time almost solely in turning castors, until he had got almost every movable article in the room mounted so as to run noiselessly. Mr. Asher is, in that respect, a true disciple of "Old Wheels"—tables, chairs, backgrounds, platforms, camera-stands, and shades are all mounted, and run with the slightest touch, on well-oiled castors. Even he himself would almost seem to be no exception to the rule, as he quietly but rapidly moves about from place to place, moving a curtain here and pushing a reflector there, keeping up the while a brisk chat with his sitter—not, as he quietly says, for any purpose such alterations serve, but to give an excuse for delay till he has ascertained something of his character and discovered the best side of his face.

The background most in favour with Mr. Asher at present is of the alcove or niche variety, about six feet wide, two feet deep, and six and a-half feet in height to top of dome. This is hooked on to a platform about nine inches high and six feet square, but shaped to fit into the curve of the niche. The whole is mounted on large castors, and is furnished with a couple of stilts like those of a plough, by which it, including the sitter, can be easily moved to any part of the room.

Having decided as to the best side of the face, and got an inkling of the character of his sitter, Mr. Asher pushes platform, background, and all into their proper places—not necessarily near the glass, but very generally a good distance from it; and a few touches to the curtains and upper shades, and the placing of a reflector—sometimes a frame with white calico, sometimes a large mirror, and sometimes the same mirror covered with blue gauze—finishes the preparation. The limited quantity of light with which he works requires an exposure of from twenty-five to thirty-five seconds, and two pictures are always taken on one plate, and generally under slightly different arrangements of lighting. The "dark room" is large and well lighted, measuring about twelve feet by fifteen feet, and is kept in first-rate order, with "a place for everything and everything in its place." He developes with a mixture of sulphate and ammonio-sulphate of iron, and gets generally nearly sufficient density by the "first intention." After a thorough washing the plate is flooded with a weak solution of gold, washed, and then has poured over it a saturated solution of bichloride of mercury. This is allowed to act only for a very short time, and the plate is again thoroughly washed; a weak solution of iodide of potass is then applied, and left only till the image becomes grey. It is then fixed as usual, and the finished negative, free from spot or flaw, is ready for the varnish. It looks, perhaps, thinner than operators generally desire; but judging from his prints—one of which I send for the inspection of the Editors and anybody who will call at the Publishing Office of this Journal—it is just the proper density.

On looking over a batch of his negatives I remarked that he did not seem to do much in the retouching line, when he replied:—"Hang the retouching! it will ruin the trade, unless the public can be taught to see the folly of its use. Unless to remove some freckles, or obliterate an accidental speck, I never have a pencil touch on a negative. If a man cannot, by the management of his light, produce all that he wants in his picture he should give up photography, and take to some trade that he is better fitted for"—a sentiment which I heartily endorse.

Mr. Sutton, in a recent letter, said that many really useful discoveries failed to command attention because they were introduced at the wrong time. I wonder if Kennett's patent pellicle may be classed under that category? For some time before its introduction in the beginning of March it got a good deal of publicity in quarters most likely to attract attention; but, although it has now been on its trial for more than two months, we have not heard a word about it, good, bad, or indifferent, except, perhaps, a couple of brief letters from Mr. Kennett himself. I am afraid he does not understand the art of "blowing his own trumpet," or of getting his friends to write him up so well as some of his predecessors in photographic invention.

The very beautiful results which I had seen from some of Burgess's plates last year made me look with favour on gelatine as a substitute for collodion, and as I considered the pellicle likely to be a useful form I set to work as soon as I succeeded in getting a supply. Mr. Kennett seems to allow some thirty-five grains to the ounce, and, although that made an emulsion which appeared too thick for even work, I succeeded, after a little practice, in getting a tolerably satisfactory film. I had expected much inconvenience from the necessity of letting the plates lie flat until hard, but was agreeably surprised that they, in a few minutes, set sufficiently to admit of being reared up on end like ordinary emulsion or collodion. The first half dozen I had made too thick, and they did not dry or get hard for at least three days; but as I got up to the way of pouring on just enough to coat the plate well, and spreading it with a strip of cardboard, I found they got quite hard in twenty-four hours. The plates so prepared are very rapid, and were easily developed to printing density, giving an image very delicate in detail—in fact, very much like a picture on an albumen film.

My first difficulty occurred invariably in the washing after fixing. The film for about an inch, sometimes more, all round became detached from the glass and "crunkled up" exactly like the frilled border of an old wife's mutch, and of course the picture to that extent was destroyed. Bad, however, as that is there is something much worse to tell. In a few hours, after fixing and thorough washing, the film becomes surface dry, but remains soft and elastic, though not tacky. In this state the image is all that can be desired; but as the film gradually gets hard—which it occupies some days in doing—the picture, beginning at the edges and slowly going towards the centre, is entirely destroyed by what seems to be the formation of the gelatine into something like cohesion figures. "Crystallisation of hypo. in the film," somebody will, perhaps, say, but that is impossible—first, because the length of time employed in washing must have removed every trace of it; secondly, because a portion of the film was removed and tested for hypo. without a trace being found; and, thirdly, because under the microscope the appearance is found not to be crystalline at all, but simply a structural arrangement of the gelatine. This, of course, was not promising, and as I had then no time for further experiments the subject was dismissed from my mind; I hope, however, that some who have been more successful, or, at least, who have experimented with the pellicle, will publish the results of their experiments for the benefit of all concerned.

About the time that Mr. Swan, of Newcastle-on-Tyne, patented his method of carbon printing some doubts were expressed as to the stability of the gelatine in consequence of its well-known hygroscopic nature. We were then assured that the gelatine of the finished print was by the action of alum rendered insoluble—in fact, converted into a kind of leather. The advantage of the use of alum or chrome alum, and the general adoption of that method of rendering the gelatine insoluble by carbon printers, has been hitherto taken for granted. I am afraid, however, that the subject would be all the better if inquired into.

I saw, a few days ago, a beautiful enlargement by the Autotype Company, from a negative by Wilson, of Aberdeen, that had been destroyed in a way which would have been impossible if the gelatine had been rendered insoluble. It had been placed for exhibition in the show-case of one of our printsellers. The heat of the sun had caused the mount to bend until the picture came in contact with the glass; the condensed moisture softened the gelatine, and when it was again converted into vapour the print was found firmly attached to the glass—so firmly that, on an attempt being made to separate them, a portion of the picture and a layer of the paper of which the board was composed was torn off, and was only after much difficulty removed from the glass. Carbon printers should see to this. They can now produce work of a very high class, and the public generally are disposed to believe that such work is as permanent as an ordinary engraving. If, however, it should get wind that a little heat and a little moisture can do such irreparable damage, carbon printing may get a shock from which it will not be able to recover for many a day.

I would like to offer a remark on the article *On the Custom of Trade in the Selling of Photographic Chemicals* at page 215 of the number for May 8th. It is, no doubt, true that in the *wholesale* trade almost every liquid, except distilled water, spirits of wine, olive, cod liver, and other oils, is quoted and invoiced by the pound. Collodion might almost be included amongst the exceptions, as of five price lists now before me one only mentions the pound in relation to it; the others, such as that of Mawson and Swan, say five ounces, ten ounces, and twenty ounces, or, as Murray and Heath quote, quarter-pints, half-pints, and pints. In the *retail* trade, however, the custom is very different—at least, on this side of the Tweed—every liquid, treacle and castor oil excepted, being sold by the fluid measure, including, of course, chloroform and sulphuric ether; the former, however, is of course charged much more per ounce than if it had been by weight, and the latter much less. J. Nicol, Ph.D.

SILVER RESIDUES.

A friend has just presented us with some curious memoranda on silver residues, showing in a striking manner the advantages possessed by skill and experience over mere knowledge, and even care, in the reduction of silver residues:—

"These residues consisted of chloride precipitated from the washings of prints and also the ashes of the blackened edges—both before toning. The dried mass was thoroughly mixed and weighed out into four equal portions. The result by four different operators was the following:—

No. 1.—10 ounces 9 dwts. pure silver.
„ 2.—11 „ 10 „ „
„ 3.—Failure from insufficient heat.
„ 4.—10 ounces 11 dwts. pure silver.

"It may be mentioned that No. 2, who gives the largest weight, is a professional reducer who advertises in your columns. All the others, except No. 3, have well-appointed laboratories, and are accustomed to assaying.

"The gold precipitated by protosulphate of iron from the baths used up in toning the prints referred to yielded eight dwts. of pure gold, equivalent to thirty-two shillings sterling. The hyposulphite used for fixing was not precipitated."

The obvious moral to be drawn from these experiments, which we give on the authority of one of the gentlemen, a skilled chemist, who does not stand highest in the foregoing list, is that it is the wisest course, when there is an accumulation of residues, to hand them over for reduction to a skilled professional reducer, mere knowledge being an inadequate substitute for technical skill and experience.

Our Editorial Table.

The Harrogate Rest.

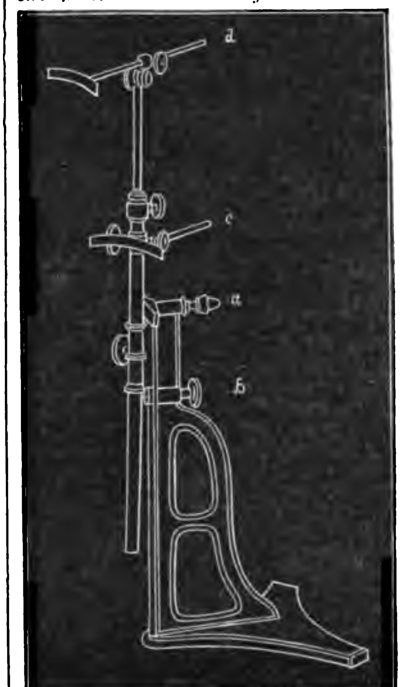
Leeds: Harvey, Reynolds and Co.

The uninitiated public possess a fixed idea that the use of a head-rest tends to stiffness in the pose; and there is scarcely a member of the community—from the girl afflicted by St. Vitus's dance to the paralytic octogenarian—who does not at heart believe that he or she without any adventitious aid can sit in a perfectly motionless state during the ten or twenty seconds required in taking a photographic negative. No practical photographer, however, who values his own reputation and the time both of himself and his sitter, will care to ignore the services of a head-rest—services which, if properly rendered, are most valuable in their character.

We have frequently said that no photographer should attempt to take a portrait without the aid of a "rest." The popular objection—that it tends to rigidity in the pose—is really valueless. A skilful artist first poses his sitter, and it is only after getting his subject well placed and when ready for exposure that he moves the fork of the rest to the head or neck. What is required in an effective "rest" is that, no matter what position may be assumed by the sitter, there shall be some one or other of the mechanical appliances connected with the rest which may easily be brought to the support either of the head, body, or limbs.

Messrs. Harvey, Reynolds, and Co., of Leeds, have forwarded to us a rest which we cannot exactly and with fairness call a *head*-rest, inasmuch as it supports the body as well as the head, but which, by whatever name designated, has been very thoroughly examined in our office by numerous metropolitan and some provincial photographers, the unanimous verdict given by whom is that "it is very good"—a verdict which we unhesitatingly endorse. The "Harrogate rest" of Messrs. Harvey, Reynolds and Co. leaves really nothing more to desire. It occupies little space, which means that it is entirely hidden by the sitter; it is exceedingly rigid; it supports the back or any other portion of the body by means of a strong projection which may be regulated and adjusted with the greatest ease; and then, as a finishing touch, and when the person to be portrayed has assumed any desired position, a second, or *head*, support is brought forward to secure the requisite immobility.

The mechanical details of the "Harrogate rest" are well designed and admirably carried out. A special feature in its construction consists in the power of throwing the head and body bifurcated limbs of the rest in a side direction without disturbing the main portion standing on the floor. This is effected by means as simple as they are sound in a mechanical point of view. Hence—no matter how fantastic or abnormal the position assumed by the sitter or stander for a portrait—in whatever position thus chosen the "Harrogate rest" will be found most assuredly a firm support. It is so universal in respect of adjustment that, while answering admirably for any "son of Anak" who may rejoice in seven feet of stature, it will answer equally well for the child of tender years.



Around *b* as an axis, and moving in a circular slot at *a*, both the body and the head portion of the rest may be rotated from side to side within certain limits, which quite include all the requirements of a rest without in the least endangering its value as respects solidity. At *c* is shown the body-rest, which is susceptible of great vertical adjustment; and at *d* we have the fork for the head. This being hinged and kept in check by an adjusting and pinching screw, can be elevated, projected, and turned in any direction.

As already stated, some leading metropolitan artists who have examined the rest forwarded to us have expressed themselves as much pleased with it. This must necessarily be the verdict of every photographer.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

The adjourned special meeting of this Society was held on Tuesday evening last, the 19th inst., the attendance being extremely small. Mr. Spiller occupied the chair.

The minutes of the previous meeting were read and confirmed.

After a few remarks by the Chairman, in which he stated that the committee appointed at the last meeting for carrying out the election of officers and council were at present in the adjoining room counting the votes, and the result would be declared at a later hour in the evening,

Mr. Jabez Hughes begged to enter his formal protest against the whole proceedings, as being illegal and out of order. Had not overweening stress been laid upon small legal points by the late Council, when they refused to entertain the requisition of a large number of the members praying for reform, the Society would not have been in the state in which it was at present; but in the rejection of the requisition alluded to, and in the present lawless proceedings, there was a palpable straining at gnats and swallowing of camels. In their proceedings both law and justice had been flung aside. Their last meeting was called for a special and distinct purpose, and yet a motion was proposed and carried of which no notice whatever had been given to the members. It was against common justice, as well as against law, that matters of which no notice had been given should be introduced at a meeting called to consider something of an entirely different nature. His own sentiments with regard to these matters were so well known that he considered it as little short of an act of impertinence that the committee should have italicised his name among the others as one fitted for election, when they had left the names of such old, tried members of the Society as Mr. Stillman, Mr. Werge, and others without this recommendation. He protested against his name being given as one peculiarly eligible for election; for he was never asked whether or not he would serve, and it was therefore offensive to him to have had his name put forward in that way.

After observations by Mr. FRY and Captain ABNEY the proceedings subsided into a state of placid waiting and private gossip, until eventually the side-door opened and the Committee entered.

The CHAIRMAN announced that the following gentleman had been elected as the officers and council to tide over the present period of difficulty, viz.:—*President:* Mr. Spiller.—*Vice-Presidents:* Dr. Mann, and Messrs. Simpson and Blanchard.—*Council:* Messrs. England, Abney, Davis, Pritchard, Dallmeyer, Jabez Hughes, Bird, Hooper, Mayland, Dr. Farre, W. Bedford, Woodbury, Crawshay, Stokes, Robinson, Howard, Rejlander, and Colonel Wortley.

After the above names had been announced; Mr. Hughes requested that his name should be withdrawn from the list of those elected. The Chairman, Mr. Bird, and others made a strong appeal to Mr. Hughes to remain on the Council, but he insisted upon his name being withdrawn, saying that he could not in any way countenance proceedings which were conducted in such total defiance of law and order.

The name of Mr. Samuel Fry was then substituted for that of Mr. Hughes; and, after the usual vote of thanks, the proceedings terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Thursday, the 14th inst., and was but thinly attended. The President occupied the chair.

Mr. Edgar Gael was admitted a member.

In the absence of a paper on any definite subject, a discursive conversation relative to the permanence of prints took place, during which nothing striking was elicited.

Mr. Kenneth exhibited several negatives taken by means of his gelatino-pellicle; and, after a general conversation on this subject, the meeting was adjourned.

At the next meeting it is understood that the new method of reproducing negatives will be demonstrated by one of the members.

BERLIN PHOTOGRAPHIC SOCIETY.

AT the first meeting in March of the above Society Dr. Vogel occupied the chair, and communicated to the meeting a recommendation of Herr Joseph Cronegh, of Vienna, to use his carton dishes; they had no resemblance, he said, to the ordinary japanned ware.

The PRESIDENT said that those he had used, and which gave such excellent results, were made of wood, and used as articles of luxury. Their varnish is of wonderful durability; and one nine inches square costs about eight shillings and sixpence, but he thought they might be had much cheaper.

Herr Hoffmann, of Dresden, sent a note on albumenised paper, which he states to be a much-neglected thing in journals, although still important enough to the practical photographer. He dwells upon the fact that there are many things in the paper for which the albumeniser cannot be held responsible, seeing that he has control neither in the making nor drying, and can therefore only approximately attain to excellence.

As Herr LINDNER remarked, however, there is nothing perceptibly new in the paper, and so we shall not translate it. Herr Lindner further said that he thought it a mistake now with many papers that they were too weakly salted.

To this the CHAIRMAN demurred. Strong salting gave, he said, weak prints, especially now when negatives were made less dense than formerly. The presence of salt in albumenised paper was in general not important. Even a quite unsalted paper would give very pretty prints; still salt heightened the sensitiveness, but a minimum would do that as well as a larger quantity and better. About one and a-quarter per cent. was now about the rule.

Herr PRÜMM said that he had got very fine prints with thin negatives on double albumenised paper made by a German firm. It gave prints he could not get at all from some negatives with ordinary paper. A part of the salt—dependent on the quality of the paper—seemed to penetrate the pores of the sheet, and he had obtained excellent prints on the back of an ordinary sheet.

Herr MAROWSKY said that plan was sometimes adopted by photographers when they had no ordinary salted paper.

The SECRETARY pointed out that with over-salted paper it was often the case that nothing but grey, mealy prints were obtainable. The chloride was too thick on the surface of the paper.

From the "question-box," after sundry minor matters had been disposed of, the following query was drawn:—"How comes it that with a collodion iodised as follows sometimes nothing but hard pictures can be got:—Iodide of ammonia and bromide of cadmium fifty grammes each, iodide of cadmium twenty-five grammes, and iodide of potassium fifty grammes? And by what means can the evil be helped?"

The PRESIDENT said the formula was a good one, and he did not think it could be at fault; probably it was the wool.

Others again, such as the Secretary and Herr Prümm, blamed the silver bath, but could not agree as to the how. One said old baths worked harder, and another that they did not. And from that the discussion slid into the wide field of the action of various collodions, baths, and the like. Irrespective of the merits of various makers there were some interesting experiences given on the influence of long or short silvering, &c. Some said that a long-silvered plate, especially if kept long after being taken from the bath, gave flat pictures.

Dr. VOGEL stated that bromide plates required long sensitising—five minutes at least. Portrait plates, as a rule, did not get more than half that time. Plates silvered long and kept long should have more bromide in them, and so the variations in the action would be lessened.

Herr REICHARD asked how best to get the alcohol out of the bath. The plan he had tried had not given good results, so that he always preferred to make a new bath rather than restore the old.

Herr SCHAARWACHTER removed the alcohol from his bath by pouring it into a flat dish and evaporating.

The CHAIRMAN stated that heating the bath to about 170° F. was, on the whole, the best plan to remove the alcohol.

Herr HARTMANN held that Osborne's method was the best—to begin the sensitising of the plate in an old bath and end it in a new. He got better results that way than by restoring the bath.

Herr BRAUN mentioned a little-known silver bath for positives, consisting of three parts of silver, one part of nitrate of potash, and forty parts of water, acidified slightly with nitric acid. He got a saving by this means of twenty-five per cent. of silver.

A MEMBER, however, stated that he had tried a similar method, and got only one sheet good off it, and in this experience others confirmed him.

Herr BRAUN, however, maintained that his results were good.

This closed the business, and the meeting was adjourned.

Correspondence.

EMULSION PLATES WITH ALBUMEN.

IN the process which I sent you last week *cobalt chloride* is introduced into the collodion. This, together with the two drops of *aqua regia*, introduces a considerable quantity of silver chloride into the emulsion. The influence of silver chloride is peculiar. It tends to clearness and brilliancy; but in emulsions used with small quantities of silver nitrate in excess it is not needed, and may be injurious. On the contrary, when the excess of silver nitrate is large, the chloride greatly diminishes the fault which I have long since found with large doses of nitrate—a thinness of image and difficulty in intensifying.

Formerly, when I desired to introduce a soluble chloride into the collodion, I took cupric chloride. I now prefer the cobalt salt, because cobalt acts more favourably in connection with silver than copper does. It is easily and abundantly soluble in alcohol.

I am confirmed in my good opinion of the new system which I described last week, and which dispenses with the operation of washing the emulsion plate. It is certain that that operation injures the plate, and that the result got by plunging the plate directly into the albumen bath is altogether superior.

In the older albumen processes much trouble has been experienced with *blistering*. This I have not encountered in any single case in my new method. Blistering does not take place, for the very simple reason that the whole film, though clinging to the plate, is really detached from it, so that any liquid underneath will slowly flow from one end of the plate to the other. The film is held with perfect security by the edging—a system which is far preferable to that of a substratum. A substratum has two bad effects. By greatly diminishing the porosity of the film it diminishes sensitiveness. It acts in this respect very much like an albumen film on paper, and we all know that this sealing up of one surface of the paper is the great source of difficulty in getting rid of the hyposulphite used in fixing. This sealing up of the under side of the film takes place equally whether india-rubber or albumen forms the substratum. It prevents the rapid penetration of the film by the developing solution, and the equal and uniform effect of the latter. The other injurious effect is that when there are two films—a film of under-stratum as well as one of collodion—there is a double chance of specks and dust forming irregularities in the finished plate.

Should any operators be troubled with blistering in using my process it will be caused by unsuitable and bad pyroxyline. Cotton for dry plates should always be such as will give a very porous film. If the film be not sufficiently porous the liquids penetrate only partially and irregularly, no free passage is formed under the film, and blisters result. If a better cotton be substituted all difficulty vanishes. The central difficulty with the emulsion process is the pyroxyline; without one that is exactly right all kinds of disappointments may be expected. I have known cases where persons have tried over and over again, with uniform failure, and have rejected the emulsion system on the ground that it required "too nice an adjustment of chemicals"—the fact being that, with good pyroxyline and adopting the method of plunging direct into the albumen bath, it is quite as easy as the wet process, and much surer.

It should be borne in mind that an emulsion negative, no matter how prepared, should never be lifted *suddenly* out of the fixing bath or from under the washing faucet into a vertical position. If water have collected under the film it will be very apt to burst it. The edging should always be made in the manner which I proposed many years ago, with the corners open; that is, at the two narrow ends of the plate the edging is to be short at the corners. The edging on the long sides is to be carried all the way across, from end to end; but on the short side the edging should stop short of joining the other by about a quarter of an inch. By raising the plate slowly the water underneath, if any, will flow through this space. If for any reason it do not, it must be let out by a pinhole.

M. Carey Lea.

Philadelphia, April 25, 1874.

A Coloured Carte de Visite by M. Léon Vidal's Process.—The Paris Salon.—The Cause of Coarseness of the Image in Certain Kinds of Negatives.

In the postscript to my last letter I mentioned that I had at length received from M. Léon Vidal the long-promised specimen of a coloured portrait from nature, done by his patented process of photopolychromy, which I have already described in this Journal. This specimen proves all that we want to know of the capabilities of the process, for it is a portrait of the *carte-de-visite* size, including about six different tints. The subject is a pretty young girl, in a pale blue dress, with a white cap and red ribbon, leaning upon a table, with a basket of flowers before her. Altogether the little picture is very artistic, and does credit to those who have been concerned in its production, including the fair model herself. Her expression, however, is not pleasing; for, whilst playing coquettishly with one of her earrings, she appears to be watching with jealous disdain the movements of her lover, who is probably flirting with some other fair one—such, at least, is an interpretation which one may put upon her clever piece of acting. At any rate, the pose permits of the display of a dainty little pair of hands, a prettily-rounded arm, a voluptuous bosom, and eyes gleaming with indignation—in perfect unconsciousness of the eye of the camera which is fixed upon her. The flesh tint is, perhaps, a shade too red, and the colour generally a little too vivid for high art, but altogether the effect is such as would be extremely likely to please the public. The specimen is a success, in my humble opinion, and much taste and cleverness have been shown in its production. On the back of the card we are informed that it is one of 700 specimens which have been ordered for an illustration to the *Révista Fotografica Universale*. I have forwarded it to our Editors for their inspection and comment, and I think they will agree with me that it is a wonderful result of printing in pigments, and a triumph of ingenuity and perseverance.

The French *Salon* is now open, and proves a great attraction to visitors to Paris. The exhibition consists this year of 3,657 paintings by modern artists, many of large size, the subjects being chiefly military, nudities, and portraits (draped) of persons whose names are not in general recorded in the catalogue. There is a magnificent portrait of Marshal MacMahon on horseback, by a young artist of 25, deaf and dumb; and this, perhaps, may remind my readers of the praise bestowed upon a large military picture—now exhibiting in our own Royal Academy collection, by a young lady of 23—by the Prince of Wales, in his speech the other day at the Academy banquet. But the picture which seems to attract most attention is one entitled *Splendour and Misery*—or, I should rather say, two pictures in one frame—by Dulz, which has a very obvious moral, since it contrasts the youthful career of a beauty of the *demi-monde* with the last sad days of an old beldame of the same class. The honours of photography will, no doubt, be accorded to this remarkable painting. It has been said that the highest compliment which can be paid to a musical composer is to have his works reproduced upon street organs; a similar remark must now hold equally true of painting, and an artist should feel flattered when his pictures are reproduced and popularised by the aid of the camera.

It is a noteworthy fact that about 3,000 pictures were submitted this year for exhibition at the Royal Academy, while only about one-third of them (in round numbers) were accepted, and of these again only about one-third are hung upon the line of the eye, the rest being "skyed" and beyond the reach of distinct vision! But in France they manage this sort of thing better. Of the 3,675 pictures now exhibiting in the *Palais de l'Industrie*, all are upon the line of the eye, and all can be distinctly seen. Why cannot we have a picture-gallery in London where 1,000 pictures can be properly exhibited? Why cannot we build such a gallery, even if it must be built of 4-inch bricks? And why, also, in our exhibitions of photographs cannot we contrive that *every* specimen shall be so hung or placed as to be distinctly seen and studied by visitors?

I hope to have a word or two to say about the exhibition of the Photographic Society of France in my next letter.

I have received from Mr. H. Browning, of Hanley, a very pretty *carte-de-visite* portrait of a lady, apparently untouched, which is remarkable as being one of the finest silver prints I have ever seen, and equally good in all other respects. The surface of the paper appears to have been burnished by a machine, which is a great improvement. The author writes for full instructions about the bromide process with the bath, in which he has become interested from reading my articles in this Journal.

I have received numerous other letters to the same effect since I came to England, and I wish most sincerely that I could answer them all briefly and satisfactory. But as this is impossible, I can only say that there is my shilling pamphlet, entitled *A New Wet Collodion Process*, of which a few copies still remain unsold at the office of this Journal; and there will also be found some further particulars scattered amongst my contributions to photographic literature, both French and English. There is also Major Russell's second edition of the *Tannin Process*.

My correspondent says that he has made a start with the process, but pressure of business has obliged him to knock off. He acts wisely in so doing. Business and experimenting cannot go on together, especially during the busy season for professional photographers. The bromide process with the bath is, I am sure, a most valuable one; and I have never said a word in its favour which I do not honestly believe to be strictly true, however much some of my remarks may have appeared to savour of exaggeration. But how is a professional portraitist to acquire a knowledge of it? The only way, I think, will be for some one who has made himself a thorough master of it to travel from studio to studio and teach it, which would, perhaps, prove very remunerative.

There is a sort of growing impression that washed bromide or bromo-iodised films give an image which is too coarse to bear enlargement up to nine times linear, and that common wet films developed with iron are in the same predicament, the only suitable negatives for enlargement being such as are taken with iodised collodion and pyrogallic developer.

In the case of a washed bromo-iodised film—including common dry plates—this may be true enough; for even Mr. Gordon's very fine albumen-preserved negatives upon washed dry films showed much coarseness of grain under a powerful microscope, when put to the test one evening by Colonel Stuart Wortley, Mr. J. T. Taylor, and myself. The reason for this may be as follows:—In a washed bromo-iodised film the iodide of silver is insensitive to light; there is consequently a series of breaks in the continuity of the sensitive material, the atoms of bromide only receiving development. This, of course, would produce coarseness in the image.

In the case of a well-washed bromide film, containing no iodide of silver and but little unconverted soluble bromide, the sensitive material would be tolerably continuous, and the image ought *not* to be coarse, and I believe is not so. The same would be true of an iodide film rendered sensitive by free nitrate.

But even when the sensitive film has *no* breaks in its continuity, from the presence of insensitive particles mixed with the sensitive ones, the iron developer seems to throw down a coarse precipitate of silver upon the latent image. This may be owing to the great rapidity with which the development takes place when iron is mixed with the free nitrate, the particles of silver deposited being larger and coarser than when the development goes on more slowly under treatment with pyrogallol.

From this it appears that washed bromo-iodide films—that is to say, common moist or dry plates—may not be the best possible for negatives which are intended for enlargements. Theoretically, one ought to give the preference to a thin negative taken upon a highly-sensitive bromide film and developed by the alkaline method. A rapid emulsion film might be as good as a bath film in this particular case.

The coarsest negatives I have ever seen were taken upon wet bromide films containing free nitrate and developed quickly with iron.

THOMAS SUTTON, B.A.

Stoak Vicarage, near Chester, May 15, 1874.

THE FERRANTI-TURNER PROCESS.

To the EDITORS.

GENTLEMEN,—I shall not occupy more of your space than is absolutely necessary to prove that Mr. Brothers and Mr. Winstanley, being both in the wrong, might have been better advised than to publish the letters which appeared in your issue of the 15th inst.

Mr. Brothers knows what his rights are, and is fully aware that other people must have rights, too, quite as unassailable as his own. When it is proved to me that circulars signed "D. Winstanley," and purporting to do Ferranti-Turner-process pictures, of which, in the words of the said circular "the effect is unique," have been sent out of Mr. Brothers' district, I think it is time to caution photographers for their own sake.

Now, in proof of the above, I hold two letters from Mr. Brothers, in which the following words occur:—"As I have before told you, the circular referred to was sent inadvertently beyond my district;" and, again: "Mr. Winstanley had no authority from me to undertake Ferranti-Turner pictures for any one out of my district. I am not, therefore, responsible for his having sent circulars beyond that radius." I would only ask you if it be possible to reconcile the above statements with the perfect knowledge Mr. Winstanley displays in his letter of the agreement Mr. Brothers holds?

I am fully prepared to believe in good intentions, and do not question Mr. Brothers' honour for a moment; still, on the face of the evidence he has given, he must admit that photographers who, like himself, have purchased licences have good grounds for complaint, to say the least of it, when attempts are made to infringe their rights. Allow me to assure Mr. Brothers that no impediment will be thrown in his way if he take care that nothing irregular is either done or permitted by him.

As for Mr. Winstanley, who has been received by me as a friend, if we must believe that he really intended being unscrupulous, it would be high time to say to him, not in the words of Shakespeare, but in Cæsar's own words, "et tu, Brute."

I trust that I have sufficiently shown that if an apology or an acknowledgment of error be needed it must come from Messrs. Brothers and Winstanley (who have sent their circulars from 14, St. Ann's-square, Manchester), and not from—Yours, &c., C. FERRANTI.

Liverpool, May 20, 1874.

EXCHANGE COLUMN.

To be exchanged for a good strong mahogany bookcase, photo. glass, best maker, half-plate French lens and camera, *carte-de-visite* lens and camera, a heavy head-rest, a mahogany tripod tourist camera stand, set of scales and weights with finger lever lift, and several quarter-plate printing-frames.—Address, AMOS RAMSBOTTOM, 37, Rutland-street, Rusholme-road, Manchester.

ANSWERS TO CORRESPONDENTS.

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

*** We again find it imperative to leave over several important and interesting articles from valued contributors.

REGISTRATIONS in next number.

J. BEVERLEY.—The note was duly forwarded.

J. WINGRAVE.—The picture had not been received up to the time of our going to press.

GEO. BAINBRIDGE.—We have not, unfortunately, a specimen of translucent paper to send you.

F. B. S.—The powder enclosed does not appear to be nitrate of baryta, but we cannot undertake to analyse it.

A MEMBER.—The election of officers and council made on Tuesday evening is only temporary. As soon as the new laws have been framed a fresh election will doubtless take place.

M'B.—By the term "fluorescence" is meant the property possessed by certain bodies of changing invisible actinic rays of high refrangibility into visible rays of low refrangibility.

RIP VAN WINKLE.—You certainly merit the *nom de plume* you have adopted. The journal respecting which you inquire ceased to exist several years ago. It did not survive a third volume.

A. H. W.—We have shown your letter to a skilful colourist, and he says it is impossible that the silver of which the image is composed could have exercised a deleterious action upon the colour.

GEORGE B. ROBERTS.—Iodide of sodium is only sparingly soluble in alcohol, although it is very soluble in water. This also applies to the bromide of sodium. The iodide and bromide of cadmium, on the contrary, are both very soluble in alcohol.

W. H. J.—There is no essential difference between the "beer and albumen" processes of Davies and Abney. You will find an account of the former in our volume for 1867, and in our ALMANAC for 1868.

W. S. H.—1. Try one and a-half grain of citric acid and two grains of pyrogallic acid to the ounce of water.—2. The addition of a few drops of a solution of nitrate of silver to the above constitutes the mixture referred to.

M. L.—Mr. W. T. Wilkinson, 14, South Street, Bromley, Kent, is the Secretary. He will, on application, furnish you with all particulars. THE BRITISH JOURNAL OF PHOTOGRAPHY may be procured in Dublin from Messrs. M'Glashon and Gill, Sackville-street.

BERLIN CARTES.—Mr. R. Freeman Barnes, New Cross, has sent us specimens of his Berlin *cartes*, of which we can say, in all honesty, that we like them a great deal better than any we have ever seen produced in Berlin. There are two among them—portraits of ladies—exceptionally excellent. The tone is a rich deep brown.

J. P.—1. The tint left in the collodion film by aurine, is not detrimental in printing.—2. Try Judson's yellow dye. Should this prove unsuitable we will send you a little aurine, if you cannot obtain it in Glasgow.—3. Wash the collodion before applying the albumen.—4. We have not had sufficient experience on these points to advise you, but the question may be settled by a few experiments.—5. A final wash of iodide will be fatal to sensitiveness, but if followed by a copious washing with water will aid in causing the plates to keep well.—6. A two-grain solution of gallic acid applied as a *final* wash, *i.e.*, not removed by subsequent washing, confers useful properties.—7. In reply: we must repeat what we have said in answer to your fourth query.

MAJOR BAIRD.—The best way to cure the defect in the lens is to remove entirely the screwed ring by which the front lens is retained in its cell, and then have the edge of the cell so reduced as to project behind the lens only so far as to admit of its being burnished over the glass. It will further improve its efficiency if, instead of burnishing the cell down upon the lens itself, you insert an annulus or flat ring of blackened brass. By adopting this course the fog caused at present by reflection from the mount will cease. When taking portraits under circumstances necessitating the camera being turned towards a strong light, we find a great improvement to result from the adoption of a long and wide projecting hood in front of the lens, this hood having a square aperture in front capable of being so adjusted as to allow no light to enter the lens except that coming from the sitter. With this appliance—which may be constructed of tin, cardboard, or thin wood—portraits of great brilliancy may frequently be obtained under circumstances when without its aid the picture would be thin, flat, and totally wanting in vigour.

ST. VINCENT BEECHEY.—Canon Beechey quite confirms what we said last week concerning the excellent qualities of Colonel Wortley's new organic dry plates:—"I got some," he says, "the other day, and subjected them to a severe test by the side of the very best plates I ever made or tried. I gave them an exposure of fifteen seconds with a Ross's six-inch focal length three-eighths stop, and they were over-exposed. Five seconds would have sufficed. And the development was so regular, gradual, and dense, as to leave nothing wanting in the way of either perfect brightness or density. In fact, they give more sparkling negatives than I have ever got with a wet plate, and I feel sure are fully as sensitive. I have now got some of the Colonel's emulsion, and intend to make a good batch of plates for the Lakes of Killarney, where I hope to go next month, with the most perfect confidence that I shall not fail in a single negative. I am rejoiced to find that our photographic friends are relieved from their fears lest Colonel Wortley's new appointment should interfere with the continuance of his scientific experiments towards the improvement, or rather perfection, of dry plates. *I* never want any better than those, and I must express my conviction that amongst all who have entered on the same praiseworthy course none have *proved* their inventions so practically by *the issue of the plates themselves*."

METEOROLOGICAL REPORT,

For two Weeks ending May 20, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
7	29·72	WNW	43	49	59	41	Fine
8	29·65	NW	42	43	55	41	Dull
9	29·68	NE	40	43	52	38	Fine
11	30·10	SSE	43	49	56	39	Fine
12	30·18	N	44	47	54	40	Fine
13	30·32	NE	47	57	—	45	Dull
14	30·37	WNW	42	50	56	48	Dull
15	29·98	WNW	49	51	59	49	Fine
16	30·40	NE	42	47	59	39	Fine
18	30·30	NE	42	47	61	39	Fine
19	30·28	NE	48	52	59	45	Fine
20	30·25	NE	46	52	—	43	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 734. Vol. XXI.—MAY 29, 1874.

PERMANENT PHOTOGRAPHS ON OPAL GLASS.

If there be still any one practising collodio-chloride printing on opal glass, we imagine he will have had his faith fearfully shaken in the process in consequence of the character publicly bestowed on it recently by members of the London Photographic Society and others, and will quickly relinquish the use of this almost universally-condemned process. "Weighed in the balances," it has been "found wanting."

One metropolitan artist, well known for the great technical skill he possesses in photography, declares that collodio-chloride is utterly untrustworthy, and that specimens prepared with the greatest care have faded even when hermetically sealed. This record is typical of the experience of many. Speaking to an American artist, who came to this country in connection with the once famous but now forgotten Vanderweyde process, with respect to a certain picture on opal glass upon which a great amount of high-class artistic labour had been bestowed, and which had been exhibited and admired in New York, he said—"Alas! it was printed by the collodio-chloride process, and it has faded to such an extent as to be unfit to be presented."

It appears from a letter we have received, and which will be found in another page, that it is to Mr. W. T. Bovey the English public are indebted for the collodio-chloride process as applied to opal or, indeed, any other kind of glass. We should like to know what Mr. Bovey's experience has been with respect to this application of Gaudin's process, and whether he can throw any light on the causes which have led to such a wide-spread condemnation of a method of printing which produces very beautiful results and is easily effected. We have seen some fine prints produced by the collodio-chloride process of Dr. John, of Vienna, which was described in our volume for 1870; but, although *they* are still beautiful and show no signs of fading, it would be folly to draw any conclusion as to their real permanence from an experience not yet extending over four years.

Permanence and beauty may, however, be found combined with the use of collodion and silver. We shall at present say nothing about what was really the first method of collodio-chloride printing (by a bath process) ever employed, because we are preparing a special article upon it, from which it will be seen that a few small suggested modifications, the result of several experiments, will render this process—which owes its paternity to one of the oldest and most eminent photographers in Scotland—decidedly simple and good, and which, further, requires no special appliance beyond a bottle of simple chlorised collodion that will keep good, even under the influence of light, for the period of time which usually falls to the lot of mortals to enjoy in this sphere. This process, as we have said, will form the subject of a subsequent article.

The majority of opal pictures produced by collodion are, we believe, those produced by the very simple method of coating an opal glass with ordinary negative collodion, exposing it in the copying camera for a few seconds to the negative, developing with iron or pyrogallic acid, fixing with cyanide, and toning with either gold or mercury—which latter substance is much to be avoided. This method possesses over all others the advantage of enabling the operator to make the picture either larger or smaller than the negative—an advantage not to be lightly esteemed. But by some of the dry processes results of an exquisitely-beautiful kind can often be obtained which, in our opinion, far transcend those by the wet process, unless a specially-thin collodion be used. Mr. Keith, of Liverpool, some years ago gave us the particulars of a method of printing of this nature practised and taught by him, producing pictures on opal which, as regards richness of tone, we have never seen surpassed and rarely equalled. The tone was a rich purple. Prints which we prepared by an analogous method four years since show no indications of fading. We hope that Mr. Keith will be induced to publish the details of the process to which we have referred.

Absolute permanence, according to the usual signification of the word, is always to be found in the carbon process. Mr. Sawyer employed no mere figure of speech when, at the last meeting of the London Photographic Society, in emphatically condemning the collodio-chloride process he applied to the carbon process the old expression "nothing like leather;" for, held together by, or imbedded in, a layer of transparent leather the atoms of carbon pigment are perfectly inert. They cannot act upon the vellum in which they are imbedded, nor can the vellum act upon them; hence permanence ensues as a matter of course. The great variety of pigmented papers now manufactured, and which have become recognised articles of commerce, renders the matter of "tone" in the finished picture so much a matter of arbitrary fact that, before commencing, the operator has merely to determine upon the tone he prefers, select a tissue accordingly, and *that* tone he will obtain, and no other, in every picture he produces.

Permanence and beauty are thus ensured; and the simplicity of the operations demanded may be deduced from the following outline of the *modus operandi*, which we give from our own experience, and which is endorsed by that of other successful workers:—

A sheet of the pigmented paper of commerce is immersed in a solution of bichromate of potash of the strength of about an ounce of the salt to a pint of water, exact proportions not being of any consequence. This salt is so very inexpensive that it is not worth while to mix a smaller quantity than this. Let the pigmented paper remain immersed for half-a-minute or a little more, and then lift it out and lay it face downwards on a plate of glass. Now remove the excess of liquid by passing over the back a rubber squeeze, or "squeegee," after which suspend the sheets in a darkened room to dry. A slip of paper having been attached to the negative so as to form a semi-opaque margin all round it, a piece of the dried and now sensitive pigment paper is exposed under it in the printing-frame for about half, or rather less than half, the time required to obtain a silver print, after which the paper is immersed in plain water for a few seconds, until it becomes limp; it is then laid face downwards upon the opal glass, previously made quite clean, and pressed into contact with it. After a few minutes it is placed in cold water so as to get a portion of the bichromate dissolved out of the paper, and is then transferred to a vessel of warm water, by which the gelatine is so softened or dissolved as to permit of the paper being pulled away from the opal plate, upon which there now remains the picture, but as yet so clogged up with pigment as to be still invisible. However, by causing the hot water to pass over the surface in waves a beautiful picture becomes rapidly revealed, and when the details are all developed by the hot water the plate is removed, and the picture, which at first has a gelatinous kind of appearance, dries down and becomes compact and brilliant.

This is literally all that has to be done to ensure an opalotype fulfilling every desirable condition as to beauty and permanence.

ON THE METHOD AND CHEMISTRY OF APPLYING ALBUMEN AS A SUBSTRATUM.

Never use a stale egg, but always provide a fresh-laid one. For the purpose you have in view an egg will go a long way, and, therefore, no trouble should be spared to get a good fresh egg. In our previous article we referred to the marked difference in the white of a fresh egg and a stale one. The egg may practically be divided into five parts:—1. The shell, with which we have nothing to do. 2. A thin membrane *(membrana putaminis)*. 3. The white, or the solution of albuminate of sodium. 4. The membrane enclosing the yolk. 5. The yolk itself.

The membrane of the yolk is connected with the cells of the albumen by ligaments which have been called "chalazæ." It also contains a number of small bodies, consisting chiefly of fat. It is the cellular membrane which imparts the ropy character to the white of the egg; and when the egg is well beaten up this forms the flocculent deposit. A stale egg is easily known by the trade method of "candling" or examining by light. New-laid eggs appear semi-transparent, and have a small and perceptible division of the skin from the shell; not so a stale one. It is said, also, that a new-laid egg always feels cold when the larger end is placed against the tongue. Again: when the egg shakes within the shell, condemn it. It is "stale and unprofitable," having lost moisture by diffusion through its porous shell. Therefore, after getting one or two good eggs—do not put too many eggs in one basket or basin—proceed to make your solution in the following manner:—Take—

The white of one egg.	
Glacial acetic acid	2 fluid drachms.
Distilled water	30 fluid ounces.

These are to be mixed in the following manner:—The white of the egg is to be beaten and blended well with a spoon in the ordinary manner, *secundem artem*, or according to the method adopted by the cook. This process thoroughly breaks up the membraneous cells and sets the albumen at liberty. The two fluid drachms of acetic acid are then to be added and well incorporated by a further whipping; and, lastly, the water is to be gradually added until the whole is thoroughly mixed. At this stage of the proceeding we have a thickish mixture containing a considerable quantity of coagulum and suspended matter. This coagulum had better be strained from the liquor with the aid of muslin, and then the liquid can be filtered through paper. The resulting solution of albumen is slightly opaque, and it is impossible to filter it perfectly bright, but on standing some time this opacity goes away.

The solution keeps perfectly, and is said to do its work thoroughly, although the quantity of actual covering albumen contained therein is so very small; in fact, it is said that no really practical benefit is found from using strong solutions, and the solution may be diluted to forty ounces. As the white of the egg only contains about twelve per cent. of actual albumen, it follows that each egg containing one and a-half ounce will contain fifty-two grains, and that each quarter of a fluid drachm of the solution (more than what would be used upon a plate) could not contain more than ·054 of a grain of albumen; yet this infinitesimal quantity seems to do its work thoroughly. Its action is probably duplex: it acts mechanically and chemically—acts, in fact, as a leveller of inequalities and also as a detergent.

The condition of the albumen liquor after filtering will be found to be only faintly acid, in spite of the fact that we have used two fluid drachms of acetic acid. Presuming that the albumen in the egg is present as an albuminate of soda, the theory of the celebrated French chemist, Gerhardt, was that there are albuminates—a neutral and an acid one; that serum and white of egg contain the acid albuminate—

$$C_{72}\,H_{111}\,Na\,N_{18}\,SO_{22}\,H_2\,O;$$

and that this acid albuminate is decomposed by heat into the neu albuminate and free albumen, which, being insoluble, separ from the liquid.

We are not prepared to endorse this theory, because from ma experiments performed since the days of Gerhardt the action heat upon solutions of salt is better understood; and what wo seem impossible to account for, except in his way and in his d has now many solutions of the riddle.

The basis for this assumption of the composition of the white an egg is that when the dried white is examined it is found contain 1·6 per cent. of soda; theory would require for the acid 1·8 per cent. If white of egg or serum be treated with caustic so a gelatinous mass is produced, which is almost insoluble in c water. This is supposed to be the neutral albuminate, and conta 3·7 per cent of soda—

$$C_{72}\,H_{110}\,Na_2\,N_{18}\,SO_{22}\,H_2\,O.$$

If we view the albumen as an acid the following represents t composition of the two salts mentioned:—

$$\begin{matrix}H\\H\end{matrix}C_{72}\,H_{110}\,N_{18}\,SO_{22} \qquad\qquad \begin{matrix}Na\\H\end{matrix}C_{72}\,H_{110}\,N_{18}\,SO_{22}$$

Albumen. Acid albuminate of sodium (white of egg).

$$\begin{matrix}Na\\Na\end{matrix}C_{72}\,H_{110}\,N_{18}\,SO_{22}$$

Neutral albuminate of soda (coagulated albumen).

Whether this theory be right or not, it is no doubt a fact that seru or white of egg is faintly alkaline when found in its natural sta and that it becomes much more strongly alkaline after the app cation of heat or coagulation. The general law governing t application of heat upon all salts when in solution is a tendency t produce a more basic salt and free acid in solution.* Here, howeve as regards the phenomenon of albumen, it is the reverse.

In making the solution of albumen described a similar positio of affairs would be brought about by the addition of the acetic acid in other words, we ought to get at the very least acid albuminate o sodium, or the compound should be entirely decomposed. But thi reaction is only partial; and it must be remembered that we hav already pointed out that it is held by some experimentalists tha albumen, so called, is a mixture of two substances—one soluble in acetic acid, and the other coagulated by acetic acid. The solutio as made according to our formula would seem to bear out this view.

The process given above furnishes a solution which shows n sign of albumen on boiling; but this bright solution is at once coagulated by nitric acid, and when exactly neutralised by ammoni and boiled gives a copious indication of that substance. An ounce of the bright solution gave on estimating it quantitatively ·84 of a grain, and as one egg had been used to the thirty-ounces of solution this represented 25·2 grains of albumen as being present still in solution, or almost exactly one-half of the entire albumen originally present.

The point worthy of observation is the extraordinarily small amount that will do its work; but thus, as an outside calculation, if one fluid drachm will do four ordinary plates, there will only be 0·27 grain of albumen on the acetic acid plate, and 0·54 grain on the plate prepared by ammonio-albumen solution.

SOMETHING MORE ABOUT EMULSIONS.

In an article in our last number Mr. Stillman writes—"I still look to an ultimate perfection of the emulsion process as the great desideratum in dry-plate photography;" and, as we heartily endorse the statement, we do not hesitate to return to the subject again, although we had an article on it very recently.

We have an idea that photographers generally are, on the whole, rather conservative in their notions, and require that there should

* *Molecular Dissociation by Heat of Compounds in Solution.* By C. Tichborne, *Chemical News*, Oct. 27, 1871.

be a considerable amount of iteration of a new process, or modification of an old one, before they can be induced to take it up, or give it a fair trial. Although we know that the suggestions of our esteemed correspondent, Mr. M. Carey Lea, are accepted with perhaps more readiness than those of any other contributor to our pages, we nevertheless think it well to direct special attention to his recent experiments with an albumen preservative in which he proposes to place the unwashed emulsion plate. During the past week we have carefully repeated his experiments, and made a large number of others in a similar direction, and are satisfied that the washing may with much advantage be dispensed with, although not exactly in the way Mr. Lea recommends, and not for the reasons he adduces.

Of the value of an albuminate of silver in a dry plate we have repeatedly expressed our favourable opinion; and of the fact of its presence in many of the well-known processes—such as Fothergill's and others—we have no doubt. We know from careful experiment that it is very sensitive to light, and that it very materially modifies the colour of the finished negative as well as the sensitiveness of the prepared plates; but for the following reasons we have considerable doubts as to its presence in the emulsion plates prepared according to the plan proposed by our valued and generally correct correspondent.

We had close at hand an emulsion made about three weeks ago, calculated to contain an excess of silver to the extent of seven grains per ounce. The calculation was made with anhydrous cadmium bromide, to prevent uncertainty from varying quantities of water contained in the commercial crystals. To two drachms of this we added an ounce of distilled water, and, after sufficient agitation and boiling in a test tube, the whole was poured into a filter. When all passed through the filter it was washed with water till the filtrate measured an ounce, which, according to theory, should have contained nearly two grains of nitrate of silver in solution. On acidifying with nitric acid, however, and testing with sodium chloride, we only obtained an exceedingly faint trace of opalescence. To try and determine approximately the quantity of silver contained in the ounce of filtrate we prepared a standard solution of silver of the strength of one per cent. Of this one drop was added to five hundred drops of distilled water, and the mixture tested with sodium chloride, when a decidedly more marked opalescence was produced, proving that the water had taken from the two drachms of emulsion less than the five-hundreth part of a grain.

The experiment was varied by coating eighteen square inches of glass with the emulsion, washing it thoroughly in three ounces of water, and testing with the soluble chloride. Again only the faintest trace of opalescence was visible, and that only when the glass was held against a dark background and the light allowed to fall on it at a particular angle. When compared with the standard solution it was proved to contain less than one-thousandth part of a grain—a quantity, we think, much to small to excercise any influence on, or be influenced by, any albumen that might be in the preservative.

We next turned our attention to the preservative, and, on making up a few ounces according to the directions of Mr. Lea, we were struck by the appearance it assumed on the addition of the prepared albumen—an appearance, both in colour and consistency, of tolerably thick cream. A little consideration, however, made the matter quite clear. Albumen is coagulated by tannin, and we had thereby got an emulsion of coagulated albumen, but of course not a solution likely to form an albuminate of silver. This albumen emulsion was poured into a filter, through which it showed much reluctance to pass; but in the course of an hour we obtained sufficient to enable us to ascertain whether any of the albumen had escaped the action of the tannin. The solution was then subjected to the action of dilute nitric acid—no precipitate; sulphuric acid—no precipitate; hydrochloric acid—no precipitate, and when boiled no violet colour; mercury chloride—no precipitate; and boiled with caustic potass—but no formation of potassium sulphide. We are, therefore, warranted in coming to the conclusion that the filtered preservative contains no albumen, and that the advantage which our friend Mr. Lea supposes we shall gain by his method can hardly be due to the cause he assigns.

Although, however, we cannot acquiesce in our correspondent's reasoning in this instance, we know his carefulness as an experimentalist too well to have any doubt as to the results which he claims to have obtained. So we proceeded to prepare some plates with the preservative as above, with a quantity made without the tannin, and with a preservative which we have hitherto found best suited for emulsion work, consisting of—

Tannin	120	grains.
Salicine	20	„
Gallic acid	40	„
Sugar	80	„
Carbolic acid	10	„
Water	20	ounces.

With each of these preservatives two plates were prepared—one washed in the usual way, the other plunged into the preservative direct. The solutions were in flat dishes; but we think dipping baths would be more convenient, as in the case of the albumen preservative we experienced considerable difficulty in getting rid of air-bubbles which were formed in consequence of the necessary rocking of the dish. The plates were treated as nearly as possible alike, and rapidly dried in a hot-air chamber at a temperature of 150° F. They were then exposed on a good test subject—an artificial lake, with a foliage-clad island in the centre, trees of various shades at the sides, and a small temple in the background—for fifty seconds, being the time previously ascertained to be required for the emulsion under ordinary conditions. The development was conducted in a dish sufficiently large to hold all the plates, and the solution contained four grains of pyrogallic acid, eight drops of a ten-grain solution of bromide of potassium, and eight drops of a drachm-to-the-ounce solution of strong ammonia. The unwashed plate with the old preservative first showed an image, followed in a few seconds by both the unwashed albumen plates, and then in the same order the washed plates also appeared.

On watching the gradual development, there could be no mistake about there being a considerable difference between the plates which had and those which had not been washed. The former seemed to stick at a certain stage, or rather to increase in density very slowly; while in the case of the washed albumen the surface lost the brilliant appearance and looked as if about to fog.

When they had been four minutes in the developing solution it was poured off, and they were washed with several changes of water and fixed in a weak solution of hyposulphite, dried, and carefully examined. Of the six, the unwashed, with old preservative, was decidedly the best; the shadows were perfectly clean, the general detail well up, and the colour a fine non-actinic greenish-brown—in fact, a first-rate printing negative. The unwashed albumen with tannin came next; its colour was a feeble green, and although it contained a considerable amount of detail it was wanting in brilliancy, and looked somewhat like a forced, under-exposed plate, while the one without tannin was still greener and considerably fogged. The washed plates were undoubtedly under-exposed, although the one with the old preservative was less so than the others.

From these experiments we are quite certain that the omission of the washing previous to immersion in the preservative is a great advantage, both as regards sensitiveness and brilliancy. Why it should be so, or why previous experimentalists have not succeeded with it, we are not yet in a position to say; but we shall take an early opportunity of still further investigating the matter, and return to the subject on a future occasion.

When operating in the field under circumstances where a scarcity of water exists, the necessary pouring away of even a few drops of which causes a kind of mental anguish, it cannot be too generally known that there are several solutions which will completely stop the action of the developer, entirely neutralising its power even when the plate is exposed to a strong light. Mixtures or solutions of golden syrup, acetic acid, glycerine, and other preparations have been suggested as each and all excellent in their way. It is, however, in a solution of acetate of soda—which we recommended two years ago as a restrainer possessing exceptional powers when mixed with protosulphate of iron—that an effective after-application to the developer is to be found; for such is the potency of this salt that it entirely neutralises everything tending to continue the action of the developer after it has done its duty in developing the latent image in the collodion film. The method of application is as follows, presuming the operator to be working in the field, with *wet* collodion, and without more than a few ounces of water, or, for that matter, without any water at all, if means can be provided for cleaning the fingers without it:—Let there be prepared a solution of acetate of soda, of about the same strength as that of the iron in the developer —that is, from ten to fifteen grains per ounce of water—and with this mix sufficient glycerine to prevent the possibility of drying and consequent crystallisation in the event of the negative having to be kept for a considerable time after development, which glycerine may, however, be omitted if the plates are so packed as to retain them in a damp condition for some time after they are brought home. Such is the action of this acetate solution that the developed plate may be brought into the light without any fear of fogging or staining.

ALBUMEN CHLORO-BROMIDE PROCESS.

SINCE writing the letter which goes by to-day's mail I have exposed and developed a number of these plates, with a view to test different preservatives. The conclusion come to is that *pyrogallic acid gives with these plates less favourable results than gallic acid.* This is a confirmation of the principle which I have repeatedly mentioned in my communications—that a preservative which gives the best results with certain quantities of silver nitrate ceases to do so when the quantity of silver nitrate is increased beyond what it will bear. With the very large quantity of silver salt needed with albumen pyrogallic acid does not suit as well as gallic. Not that it fails—on the contrary, it gives excellent results; but, when carefully compared with gallic acid, the latter is found to be the better of the two.

Another result found was that pyrogallic acid used with albumen and gum *is improved by the addition of tannin.* The improvement was well marked, but the plates so prepared, though better than those made without the tannin, were inferior to those made with gallic acid without tannin. Here is another confirmation of the same principle—tannin is one of the least sensitive preservatives. If the quantity of silver nitrate used had been right for pyrogallic acid tannin would have injured the plate and diminished the sensitiveness, whereas in the present case it increased the sensitiveness and benefited the plate.

With this new process we get dry plates made as easily as wet, as sensitive, and not to be distinguished from them in appearance. They do not resemble wet plates developed with pyrogallic acid, but have just the look of iron-developed wet plates made with a bath in first-rate order. They show brightly as positives by reflection; at least this is the case when potassium bromide is used in the development. Very little bromide is sufficient—half-a-drachm of fifteen-grain solution in a four-ounce bath is almost too much; and it may very likely prove with more experience that bromide is best omitted altogether in the development.

Whether gallic acid be improved or not by the addition of tannin is not yet quite decided. Such good results are got in both ways that much experience will be needed to decide; and some will probably prefer the one method, and others the other.

If to a plain and bromised collodion there be added a grain to the ounce of a chloride, copper-chloride, or cobalt-chloride (I prefer the latter), and two drops of *aqua regia*, and this be sensitised with from twenty to twenty-five grains of silver nitrate (the latter is the best when the collodion is fully salted), and then, after well shaking, the emulsion be set aside ten or twelve hours, it will be in excellent condition to be used with a plain gallic bath as follows:—

Dissolve eighty grains of gum arabic and thirty of white lump sugar in eight ounces of water; add to this five drachms of prepared albumen, and, lastly, three drachms of fifty-grain alcoholic solution of gallic acid.

The prepared albumen is made by shaking up white of egg with an equal bulk of water, and adding half-a-drachm of acetic acid (Beaufoy's acid, sometimes called "No. 8") for each ounce of white of egg. The dilute albumen thus prepared can easily be filtered by putting a piece of clean sponge in the throat of a glass funnel.

Into this bath the plates are put as soon as set. They should be left in rather longer than is necessary merely to remove the greasy marks; about seven or eight minutes will be sufficient, and ten or twelve not too much.

To develope a whole-size plate, take a 7 × 9 porcelain pan, pour into it four ounces of water (which should best be tepid, though this is not necessary), add half-a-drachm of fifty-grain alcoholic solution of pyro., and slide the plate in. After half-a-minute take it out and add half-a-drachm of eighty-grain solution of flinty ammonium carbonate and half-a-drachm of fifteen-grain solution of potassium bromide. If the exposure have been sufficient this will finish the development. If not, the quantity of ammonia may be doubled or trebled. I have never seen any advantage in any form of the emulsion process from using heavy doses of ammonia. Where there has been evident under-exposure, and there threatens to be a want of detail, it is very useful to add a second dose of pyro.—same amount as at first.

One very curious fact remains to be mentioned in connection with these albumen emulsion plates made without washing. If the immersion in the preservative bath have been a little scant, so that a trace of silver nitrate is left unprecipitated by the albumen, *there does not result fog as might be expected.* Such a plate comes out perfectly clean, and not even veiled. There is no sign *in the plate* of free silver nitrate; but there is found at the bottom of the pan a little greyish precipitate of reduced silver, formed during the development of the plate.

This is when there is a trace only of silver present; a larger amount causes fog.

I have never had a plate fog, but have occasionally seen the following indications:—At the edges of the plate, near the corner where the excess of emulsion is poured off, there are always narrow bands of thicker film, and these, of course, take longer to be penetrated. Occasionally these bands turn black in development. This is, of course, no injury, as they are behind the rebate of the frame; but the meaning of the appearance is evident.

As the plate when taken from the preservative bath has a certain quantity of bath adhering to it, it is evident that the action of the bath on the free silver of the film may continue until the plate dries; so that a plate might, when taken from the bath, have within it a small quantity of unprecipitated silver nitrate, which, again, may be removed during the drying. It would seem, therefore, that a gradual drying at ordinary temperature would be more favourable than a rapid one by heat; or, at least, that if plates dried by heat showed any tendency to fog it would indicate that they should have been left longer in the preservative bath. I have always dried my plates over sulphuric acid, and have had no indications of fogging. I make the above suggestion to meet the possible case that those who dry by heat might have any trouble, and to show the remedy; for I am desirous that this process should be largely tried. It is so far superior to any other that I have ever used that it seems to me it must supersede other dry work—all the more as its improved results are obtained, not by complicating, but by simplifying, the manipulations; just as in the wet process a plate is coated and dipped into a bath and then finished. It may be dried or may, probably, be used wet. This I have not tried, but there can be little doubt of it. I have not tried it only because I have had so many other points to settle by experiment that seemed more important that, so far, I have not been able to take the time. It would be simpler, however, if these plates would not admit of being used wet with either a pyrogallic or an iron developer. But in either case it would be necessary to add silver to the developer, unless the plate was left so short a time in the bath as not to remove all free silver nitrate, or unless alkaline pyrogallic acid be used.

I have said already that these plates resemble iron-developed wet plates in appearance, and the same similarity holds in the printing. All dry-plate workers know the difference between wet and dry negative printing, and many hold that a dry plate, unless the development be terminated with acid pyro. and silver, gives results that want something in finish and perfection. This objection does not apply to the new process—the plates print precisely like wet negatives.

One peculiar difference between wet and dry negatives is this:— Where a dry plate, when held up to the light, appears quite opaque, it will print opaque, and such portions will be quite white in the positive prints. But, in the case of a wet negative, often portions that seem opaque when held up to the light will, nevertheless, allow bright sunlight to pass through, and print with a faint tint. I consider this a decided advantage, as there is less danger of chalkiness in the high lights. In this respect these new plates resemble wet negatives, and not ordinary dry ones, and a brilliant-looking negative will print harmoniously, and not give a hard print.

On the other hand, there is not the slightest difficulty in getting any amount of density that may be desired. The operation is completely under control, and I have not, so far, in any single case seen a need of an acid redevelopment.

M. CAREY LEA.

Philadelphia, May 11, 1874.

REMARKS ON THE ASSERTED INFLUENCE OF COLOURING MATTERS ON THE REDUCTION OF SILVER SALTS.

[A communication to the London Photographic Society.]

It will be in the recollection of my hearers that Dr. Hermann Vogel announced last year that he had succeeded in rendering bromide of silver sensitive to the so-called chemically inactive rays. Operating upon dry bromide plates washed with coraline yellow and aniline green, the author states that, whilst restraining the influence of the rays coinciding with the more refrangible part of the solar spectrum, the sensitised surface becomes directly affected by the luminous rays, and particularly by those situate in the yellow of the spectrum near the fixed lines D. Dr. Vogel infers from his experiments that he has thus afforded proof that the optical absorptive powers of the admixed substance play an important part in determining the sensibility of photographic plates, enabling them to record an impression within an area not previously supposed to be capable of true chemical activity.*

Such is the important result to which Dr. Vogel has arrived; and his deductions are at all times entitled to be received with the greatest consideration and respect; but they have already been subject to criticism in America, where Mr. M. Carey Lea, in describing his own experiments, does not hesitate to throw considerable doubt upon the reception of this provisional hypothesis. As a contribution towards the further discussion of this question I beg leave to relate the particulars of some experiments recently made by myself, which tend to support the objections urged by Mr. Lea.

1. A bromide of silver emulsion plate was washed with water, and then coated with an aqueous solution of soluble aurine (coraline). The plate was allowed to dry, and then exposed to diffused daylight for twenty minutes under a double layer of ordinary non-actinic orange glass (such as I have often used in the windows of my collodion operating room, and which freely admits rays of the refrangibility of those in the neighbourhood of the fixed line D). A slip of wood was placed diagonally across the holder so as to cast a shadow in the event of chemically-active rays operating upon the plate. On treating with an iron developer there was no apparent difference observed, and *no image* shown upon the plate.

2. A similar experiment made with a bromised plate washed with aniline green and exposed under the same conditions gave no image.

3. Another plate treated with the aniline green was thoroughly dried before exposure with no different result. This time the exposure was prolonged for half-an-hour on a bright, sunny afternoon, and the attempted development pushed to the point of staining the plate.

4. A sheet of sensitised chloride paper, having both ammonia-nitrate of silver and ammoniacal solution of aurine on its surface, was not found to be affected under the orange glass in the space of an hour. Having used upon several occasions an alcoholic solution of aurine mixed with shellac varnish as a perfectly successful adiactinic medium, it seems impossible to believe that the use of this coloured material should confer a special sensitiveness upon silver preparations placed beneath it without such effects having been previously observed in practice.

As yet I have had no opportunity of working with salicine in the new directions proposed by Mr. Lea; but, with regard to the main point at issue, I feel disposed to endorse the statement made by the eminent American author in the concluding paragraph of his paper (see The British Journal of Photography, March 13, 1874, p. 121):—"Whilst fully appreciating the interest which attaches to Dr. Vogel's investigation and his reliability as a practised experimentalist, I cannot help concluding from my own results that there exists no law connecting the colour of a substance placed in contact with a sensitive body and the increased or diminished sensitiveness imparted to that body as respects particular rays of light."

The subject of the tinting of films has lately attracted much attention on the part of Mr. Henry Cooper, Mr. Russell Manners Gordon, and Colonel H. Stuart Wortley; and a few other new observations bearing upon the use of colouring materials on sensitive surfaces have been elicited in the course of this inquiry, but the results are not yet sufficiently elaborated to enable me to include them in this communication.

John Spiller, F.C.S. (London and Berlin).

FREE SILVER IN EMULSION.

I am sure Mr. Stillman desires to do full justice to all his fellow-workers who publish their ideas for the benefit of the photographic world at large. I must, therefore, ask leave to point out that prior to June, 1871, Mr. M. Carey Lea recommended nine grains only of silver in summer, and ten grains in winter.

In a paper I read before the London Photographic Society in that month, and in which I fully acknowledged Mr. Lea's services, I pointed out that, to make a good and sensitive emulsion, it was necessary that the emulsion should in the first instance carry as much silver as possible; and I afterwards combated strongly the position Mr. Lea took up, *i.e.*, that "it was useless loading down the emulsion with silver."

I now know that an emulsion commenced with ten grains of silver can never be made as sensitive as one commenced with sixteen, and Mr. Stillman and Mr. Lea himself both now advocate the larger amount of silver. I was the first to point out this large amount of silver as an absolute necessity for the best work; and as I had a long and hard battle to fight to establish my claims, I am not inclined to sit down now and fold my hands, saying—

"Hos ego versiculos feci, tulit alter honores."

Such honours as may be my due for pointing out that Mr. M. Carey Lea was in error in condemning the "loading down of an emulsion with silver," and for insisting on such "loading down" as a *sine quâ non* for *sensitive* emulsion work, I ask Mr. Stillman to allow to me.

One more point: a bromide of silver formed in an emulsion with a very large excess of silver *at first*, such as I advocate, behaves in a different and far better way than a bromide formed with the small amount of nitrate of silver used by Mr. Lea, and beyond which he argued it was useless and injurious to go; and no after-manipulation will give to the ten-grains emulsion the good qualities possessed by the other. The processes are, in fact, entirely different. One bromide of silver will turn black in the sunlight; the other will remain a pale grey. One emulsion will look grey by transmitted light; the other brown yellow.

So long as I publish my discoveries, and do not attempt to sell secrets, I feel I may fairly claim such credit as may be my due. I freely accord to Mr. Lea all possible honour; but I still feel it due to myself to claim that in June, 1871, I laid down the laws that will govern the future of emulsion work.

H. Stuart Wortley.

THE FIRST STEP IN PHOTOGRAPHIC CHEMISTRY.

It is a singular fact that even the first step has not yet been taken in photographic chemistry. What do we really know for certain of the nature of the change produced by light upon any of the sensitive substances which we employ daily in the production of negatives and prints? We may *guess* at the nature of that change; but what have we really *proved* by an appeal to the chemical balance? Absolutely nothing!

This is singular, considering what rapid strides have been made by practical men in the practice of photography in its various branches; and the fact does not redound greatly to the credit of those scientific gentlemen who have made a hobby of the art for a number of years, who have spent a vast deal of time in experiments, and who have been surrounded by the appliances necessary for making exact quantitative and qualitative analyses.

But the fact may be that the subject is one of considerable difficulty, involving not merely a knowledge of ordinary chemistry and chemical manipulation, but also good sound reasoning powers. A man must have *brains*, as well as hands and eyes, in order to work out problems of this kind in a satisfactory manner. It is not difficult to perform a few random experiments, and make a guess as to the cause of the results obtained; but it is a far different thing to perform with conscientious accuracy such experiments as really bear upon the problem in hand and to interpret them rightly.

There *may*, perhaps, be men in our ranks capable of taking the first step in photographic chemistry, but who have not, unfortunately, the necessary chemical appliances; and there may be men amongst us who *have* a well-appointed laboratory, but who have not the brains necessary to organise a series of systematic experiments or to rightly interpret the results. Be that as it may, photographic chemistry offers a wide and a highly-interesting field of research which has not, as yet, been trodden by any competent explorer.

Where, then, should this new field be entered? In what direction should an explorer proceed? What should be the first fact which he should endeavour to establish and explain?

The most important substance used in our art at the present day is, undoubtedly, bromide of silver, since it enters into the composition of nearly all our sensitive negative films, and bids fair to have in the future a still wider application. What, then, is the effect of light upon chemically-pure bromide of silver? We may fairly consider

* See *Photographic News*, Dec. 12, 1873, p. 589.

this question as standing at the very threshold of photographic chemistry. Let us, then, endeavour to answer it; let each of us who is able contribute his mite towards its solution; and if we have not the means of making exact quantitative analyses ourselves let us, at anyrate, endeavour to reason correctly upon such rough facts as we may *have* established, if only to guide more accurate experimentalists to a right conclusion.

No experiment has yet been recorded in which chemically-pure and dry bromide of silver has been exposed to light out of contact with any other substance; but the following seems to throw a good deal of light upon the question of what happens when well-washed bromide of silver is exposed to light in the presence of water or atmospheric moisture.

Take a quantity of dry bromide of silver which has been thoroughly washed free from all soluble salts; weigh it, and put it into a clear glass vessel containing distilled water. So long as this remains in the dark it will be neutral to test paper.

Now expose it to sunshine, keeping the bromide of silver well stirred or shaken all the time. It will quickly change from a pale yellow to a grey tint, and, at the same time, a piece of blue litmus paper put into the water will be strongly reddened.

Take the mixture into the dark room, let the bromide of silver settle, pour off the acid water into another vessel, add fresh distilled water to the darkened bromide, and then expose it again to the sunshine, stirring or shaking the mixture as before.

When this has gone on for some time add the acid water to the former lot, and proceed again as before described. Repeat this operation until blue litmus paper put into the water is no longer reddened by the action of light upon the bromide of silver.

Now collect all the acid water; and dry and weigh the precipitate of darkened bromide of silver.

This experiment, when carefully performed, will, I believe, prove two things, viz.:—1. That the acid in the water is hydrobromic acid, produced by some of the bromine having left the silver to combine with the hydrogen of the water. 2. That the dark grey precipitate is sub-bromide of silver, composed of three atoms of silver in combination with one of bromine.

But the absolute proof of this is what we require, and it can only be given by operating upon a sufficiently-large quantity of material, and by performing the operation with extreme care and with suitable appliances. Now, assuming the dark grey substance to be sub-bromide of silver, what are its properties? In the first place, it does not appear to be readily acted on by nitric acid of any strength; in the next place, it appears to be readily dissolved by hyposulphite of soda, but whether this leaves any precipitate of metallic silver I am not positively certain.

If the experiments which I have described were made with great care by a competent person provided with the necessary apparatus—which would take him, perhaps, a couple of mornings—we should have made our first step in photographic chemistry; and a most important step it would be. Who, then, is competent to make this experiment? or who will pay to have it performed? Are we for ever to remain in ignorance because no good chemist, provided with suitable apparatus, and without having any foregone conclusions upon his mind to vitiate his reasoning or falsify his results, will undertake the experiment required? Let us hope not.

But the questions—What is sub-bromide of silver? and What are its properties? have already been mooted in this Journal during the last few months. Mr. Bolton and Mr. Stillman have each referred to it, and the latter gentleman applied to Dr. Liesegang for an answer. Mr. M. Carey Lea has also told us, at page 206, that the black material of a negative upon a bromide of silver film is probably sub-bromide of silver.

I will venture to offer a few words both on Dr. Liesegang's reply to Mr. Stillman and on the hypothesis of Mr. Lea.

Dr. Liesegang, in his reply to Mr. Stillman, said that the formula for sub-bromide of silver is Ag_2 Br; but Dr. Liesegang must be strangely unacquainted with modern chemistry to give such a formula as this, seeing that such a compound would be impossible, inasmuch as bromine is not a dyad but a triad, and can, therefore, only combine with a single atom of silver to form monobromide, its other two bonds being masked by combining with each other; or with three atoms of silver, all its three bonds being then engaged. Such a formula, therefore, as Ag_2 Br is absolute nonsense. There may be Ag Br or Ag_3 Br; but there cannot be Ag_2 Br, unless the leading chemists of the world have made a strange mistake.

Next, with respect to Mr. Lea's supposition that the black material of an alkaline developed negative upon a bromide of silver film is sub-bromide of silver. If this be true, then sub-bromide of silver must have very different properties from the grey substance which is produced by exposing bromide of silver to light, under water, as I have described in this article, because that grey substance is *not* readily acted on by nitric acid, and *is* readily acted on by hyposulphite of soda; whilst the blacks of the negative are readily acted on by nitric acid, and are *not* readily acted on by hyposulphite of soda.

Mr. Lea has, I think, formed his conclusion somewhat hastily from the following experiment, which can easily be explained in another way (see the last paragraph of his article at page 206):—

He took a negative upon a bromide of silver film, fixed it with sodium hyposulphite, and then treated it with nitric acid. There remained under the blacks of the negative a pale yellow, insoluble film. From this he concluded that the blacks of the negative were probably composed of sub-bromide of silver—which substance must therefore, according to his supposition, be soluble in nitric acid, but insoluble in hyposulphite of soda.

The true explanation of his experiment is, I think, this, and it leads to a very different supposition:—His negative was not fully exposed and fully developed, as could have been proved had he treated it with nitric acid *before* the application of hyposulphite. There consequently remained under the blacks of the negative some unreduced bromide of silver. This was protected from the action of the hyposulphite by the superincumbent black metallic silver, so that when the latter was dissolved by nitric acid the unreduced bromide of silver beneath remained, and constituted the yellow film in question.

Nothing is more common in the bromide process than for the bromide of silver *not* to be entirely reduced by the alkaline developer under the sky and other high lights. Those who convert bromide negatives into positives by the nitric acid treatment stumble upon this fact so often that it constitutes one of the chief difficulties in that process. But when the process succeeds, the sky and high lights are as clear as the glass itself. Now, it is impossible to suppose that when the blacks of a negative are treated with nitric acid *before* the negative is fixed with hyposulphite they should yield clear glass, whilst the *same* blacks should yield a yellow film of monobromide of silver if the nitric acid treatment be preceded by the fixation with hyposulphite of soda! *Should* a yellow film of any kind be left under *such* circumstances I should regard it as composed of yellow sulphide of silver. THOMAS SUTTON, B.A.

M. DUCOS DU HAURON'S HELIOCHROMIC PROCESS.

THE interest which all modes of producing effects in natural colours by more or less direct photography excites in France is very much greater than with us, for here it is difficult to get up any general enthusiasm upon the subject; and, unless it be the process of M. de St. Florent, there has been no method published which has stimulated amongst us any interest or excited any emulative feeling. Still it is well to be acquainted with these various attempts, for one never knows what may one day spring suddenly out of them.

M. Ducos du Hauron is one of the most enthusiastic French *laborateurs* in this field, and he has recently addressed a letter to the President of the Photographic Society of France, describing his discoveries and the modifications which his process has undergone. His principles of action are essentially similar to those of M. Vidal, only that he deals with the negative in the first instance, not the print. Instead of requiring a surface which gave uniform results, he sought a chameleon film, on which whatever colours of rays he chose to project through the lens would be impressed. His scheme was projected on the very simple formulary that, as the experience of painters had proclaimed that three colours, red, yellow, and blue, mixed together in various proportion gave an infinite variety of shades, it followed that a subject from nature might, in the same manner, be resolved into its three primary elements, and a red, blue, and yellow image be taken separately, each embodying the whole of the shades of the particular colour, and capable of being afterwards reunited into an exact counterpart of the original. The question is—Cannot photography produce this combination? If it can, heliochromy is obtained.

M. Ducos du Hauron answers the question in the affirmative, and, fanciful though the notion may seem, avers that heliochromy *has* thus been found. As long ago as November, 1868, he described and exhibited samples of his first essays in this field; and the mode of operation which he then indicated was this:—

(1.) To obtain in the camera three negatives of the same subject—the first through the medium of a green glass; the second through a violet-blue; and the third through an orange. (2.) To obtain by either the carbon processes known or by other similar processes—such as chromolithography or Woodburytype *(photoglyptie)*, &c.—a

red positive print by means of the negative taken with the green glass, a yellow print with the blue-ray negative, and a blue print with the orange-ray negative. These three prints incorporated with one another would constitute by their blending of tints a perfect and polychromatic representation of the original subject.

That this system was capable of being put in operation M. Ducos demonstrated by his specimens; but he admits that the means proposed left much to be desired, and he has been but little surprised to find that nobody sought to follow in his steps. Among these difficulties not the least is the excessive duration of the exposure necessary to obtain a plate through an orange or even a green glass. Hence the necessity of having recourse to dodges little in accord with the simple designs in view, and which tend to injure the purity of the images. This has not, however, discouraged this gentleman, and he has attained greater completeness and more practicability in his process. We must, however, defer our description of his modifications.

ON THE REPRODUCTION OF NEGATIVES BY THE POWDER PROCESS.

[A communication to Mr. H. Baden Pritchard, read at a meeting of the London Photographic Society.]

In accordance with your request I have returned the two negatives you forwarded to me, together with eight reproductions from the same. I have taken care not to retouch them in any way so that you may see that all the defects in the original are shown in the reproductions.

The sensitive compound I have hitherto employed for coating the plates is made up of—

Dextrine	4 grammes.
Ordinary white sugar	5 „
Bichromate of ammonia	2 „
Water	100 „
Glycerine, according to the condition of the atmosphere	2 to 8 drops.

I have just made an improvement in the process, however, by discovering a mixture to supersede the dextrine-sugar solution which will keep good for years. I have forwarded you a bottle of this new mixture, as also a small flask of the collodion I employ for stripping the pictures; I also send some of the graphite employed by me, and a dusting brush. With these materials I am convinced a result will be obtained at the very first attempt.

A new,. well-cleaned, patent plate is coated with the sensitive chromium solution, and after the superfluous liquid has been allowed to flow off at one of the corners the plate is dried in the dark by being placed upon a lithographic stone or metal plate, a period of ten minutes being sufficient for the purpose, with a temperature of 120° to 160° F.

The film being perfectly dry, the plate, still warm, is put under a negative and printed in the shade for ten or fifteen minutes. As soon as it comes out of the printing-frame the plate is again slightly warmed, the brush is dipped into the graphite and applied over the surface of the image, which should be just slightly visible. The application of the powder is carried on in a shaded corner of an ordinary room illuminated by daylight. You must not press hardly upon the film with the brush, but move the same over the surface as lightly as possible; nor will it do to hurry the operation.

In proportion as the film cools so the image appears. By carefully breathing, or, better still, blowing, upon the film you will be able to accelerate the process, and when the picture has attained sufficient vigour you take off the superfluous graphite powder with a clean brush.

A normal collodion is now applied, such as I send, composed of—

Alcohol	500 parts.
Ether	500 „
Pyroxyline	15 to 20 „

When this film has set and hardened the margins are cut round with a knife, and the plate put into a porcelain dish of cold water. In three minutes the picture will be free from the glass, and the film may be employed in this position or reversed with a soft brush, and taken out of the water adhering either to the same glass plate or to another. A gentle stream of water falling upon the film will remove any chromium salts still remaining in it, and will also press down the loose film uniformly upon the glass surface. Finally: the plate is allowed to dry in a perpendicular position. Further treatment of the plate with varnish follows as a matter of course.

The image upon the collodion film is very thin; but you need be under no apprehension of its tearing while in the water, when it may be easily manipulated. I have to do with films of this kind measuring three feet square.

I shall be glad to know if the process finds favour with the Photographic Society of London, and trust that you or some other member of the Society will make experiments with it. J. B. Obernetter.

THE SILVER BATH AND THE COAGULATION OF THE ALBUMEN.

A French chemist, M. Encausse, writes to the *Moniteur* to point out an error which he thinks does grievous harm to the permanence of albumenised prints, viz., the use of neutral sensitising baths.

Possessed of some prints which had become almost invisible in the album, he was desirous of ascertaining the cause of their disappearance, and in order to do so he had made the prints sufficiently transparent to allow of their being examined piecemeal under the microscope; and he at once found places devoid of albumen. How could this happen? It appeared to him to be due to an imperfect coagulation at the time of sensitising; but, to assure himself, M. Encausse undertook some experiments which appear to have led him to conclude that the bath had to do with the fading in this way:—

Some ordinary-sized Rives paper was taken and albumenised on albumen previously prepared, and which had been divided into three portions. The first portion, used pure, was salted with chloride of sodium to the extent of three per cent. This gave a very brilliant surface. The second portion had added to it ten per cent. of its weight of distilled water, and was salted like the first. It gave a very equal surface, but less brilliant. The third portion was mixed with twenty per cent. of distilled water, but with no difference in the proportion of salting.

In preparing thus three samples of paper M. Encausse was desirous of noting the action of the silver bath upon films of albumen of various thicknesses. The coagulating power remaining the same in all cases, the bath being unchanged, he found that the thickness of the film was of no consequence so far as the solidity of the prints was concerned.

He then proceeded to test the effects of nitric acid upon the albumen films. First, some bits of paper were floated on a bath containing about six ounces of soda and a few drops of nitric acid for five minutes, then dried carefully and washed with distilled water. The washing revealed imperfect coagulation, part of the albumen being removed in the water. The quantity of monohydrated nitric acid was gradually increased until it corresponded to the amount that would be in a normal bath of about three drachms of silver to four ounces of water. In all cases, however, the albumen not coagulated is dissolved with facility in simple water. How fares it with the film, then, when it has undergone toning and fixing? The metallic layer is preserved certainly after lighting, but it cannot be esteemed permanently secured when the supporting albumen layer has been partially washed away. That half-coagulated albumen is injurious, therefore, M. Encausse holds as proved; but he is to devote further researches to the influence of the toning and fixing.

ON THE COLLODIO-CHLORIDE PROCESS.

[A communication to the London Photographic Society.]

It is nearly ten years since this Society was put in possession of one of the most beautiful and perfect processes connected with our charming art. The principle of holding chloride of silver in suspension in collodion, and thus making a sensitive emulsion, was the invention of our esteemed and active member, Mr. G. W. Simpson.* The process was given unfettered, caused considerable excitement at the time, was frequently designated the chief discovery in the art in the year 1865, produced results that charmed all who saw them, had various applications, and yet has only proved a commercial success in the hands of a small minority. How this should happen is difficult to explain. Some consider that its permanency is doubtful; yet some prints on the table have been done for years, undergone no change whatever, and certainly, as regards permanency, the process will compare most favourably with anything produced upon an albumenised surface. Then others exclaim—"It is too troublesome!—it is quite impracticable to work the process commercially!" and yet these very gentlemen have never set their brains to work to see whether it cannot be made less troublesome. Is a beautiful process to be condemned because prints have a ten-

* A communication on this subject will be found in the correspondence pages of the present number, from which it will be seen that had Mr. Hooper been more thoroughly informed on the history of photographic discovery than seems to have been the case, he would not have committed himself to such an erroneous statement. —Eds.

dency to roll up when toned? Others think the process slow; but this is a decided error, as it may be reckoned about three times as quick as printing upon ordinary albumenised paper. Others think it very difficult to get a certain tone they desire; but this is really a very easy matter, and quite as much under the control of the operator as the ordinary silver-paper process, and far greater brilliancy, richness, and roundness, or contrast, is obtainable, as well as the print being more upon the surface, and contained in a film of such a structureless nature as to add greatly to the general effect when finished.

All that has been said thus far alludes to the use of the collodio-chloride process upon paper; but when we consider its useful applications upon glass and various other substances it is then we cannot praise it too highly. Whether for printing transparencies by contact-printing or ornamental purposes upon opal glass, pot-metal, ground glass, earthenware, &c., or for any transfer process, in all these directions the collodio-chloride process has unquestionable advantages, and only requires a fair trial to hold a most favourable position when compared with any other known process. But we will return to the discussion of the process upon paper. The *cartes* handed round for your inspection and criticism are printed upon Herr Obernetter's paper, kindly forwarded to me by Mr. George Bruce, of Dunse. They were my first trials upon this paper, only printed last week, and were toned and fixed in the same baths I use for my regular work; that is, an ordinary acetate of soda toning bath, strength thirty grains of acetate to one grain of gold, and fixed for five minutes in hyposulphite of soda of the usual strength, namely, one part soda to five or six parts water. The prints are first thoroughly washed in two or three waters and then toned. Any desired tint is easily obtained; they go back very little in fixing, but when dried look more toned than whilst wet. They require several washings before being mounted, but not so much as albumenised prints; and I have found it best to cut the prints whilst still wet, and mount them in the damp state.

Before leaving this part of the subject I would add that, although the prints just referred to have been toned in an ordinary acetate of soda bath, I am informed by Mr. George Bruce and others that they would have been of a still better colour had I tried the sulpho-cyanide of ammonium bath, and I am convinced such is the case. The rolling up of the prints is certainly a drawback to the process, but not an insurmountable difficulty.

The collodio-chloride paper of Herr Obernetter is very good and trustworthy, but has one fault, and that is, it prints too rapidly, or, rather, the shadows become bronzed before all the beauties of the negative are fully printed out. This is so much the case that an over-exposed and slightly veiled negative is really more suitable than one of good qualities. Greater contrast, brilliancy, richness, and roundness of effect are its favourable qualifications, as well as greater rapidity. I have also received a sample of collodio-chloride emulsion from Messrs. Mawson and Swan, of Newcastle, which is very excellent, though I think it might be made more sensitive. In this (its original) form it is very useful, and with slight modifications in its composition might prove available for printing enlarged transparencies in the camera, and produce far more pleasing pictures than any other emulsion process. Perhaps some adept in the art will give it a fair trial, and report at a future meeting. For printing transparencies by contact the emulsion referred to is everything that can be desired. Some specimens on the table, kindly lent for the occasion, have been executed nearly ten years, and not undergone any change, although no particular care has been taken of them. This and many other testimonies all go to speak well of its permanence; and when we take all these advantages into due consideration, and remember that this is a process that has never been patiently and systematically worked out, is it not a question whether such should not be done, so that an easy, certain, and permanent process may be perfected?

Many useful and valuable hints were enunciated at the time of its discovery; and although I have been careful in this short paper to avoid going into the chemical composition of this emulsion, yet I may add that some experimentalists have found great advantages by using "carbonate of silver" instead of "chloride of silver," and others found advantage by adding citric acid in varying proportions. All these and many other suggestions of an important nature should be duly weighed, and, if practicable, aid in perfecting a process which could be used for printing direct in the camera, and with considerable rapidity. The collodio-chloride process upon glass, by development, has never received the attention it deserved at the hands of our clever experimentalists. In conclusion: I trust the few words written and the prints handed round will encourage some of our members to give the subject full investigation, and see whether a permanent process surpassing in beauty albumenised prints cannot be perfected, and ultimately become universally adopted, on account of its greater advantages as well as its simplicity and rapidity of execution. GEORGE HOOPER.

Correspondence.

Philadelphia, May 4, 1874.

CLAIMS OF THE LATE REV. J. B. READE.—GELATINE NEGATIVES.—"DUST PROCESS."—ALBUMEN EMULSION PROCESS.—DR. VOGEL'S BROMIDE THEORY.

IT is certainly remarkable that the late Rev. J. B. Reade should receive so scanty a proportion of the honour which is due to him as one of the founders of photography. M. Chevreul, in his recent essay, ascribes the discovery of heliography to Niepce, of the daguerreotype to Daguerre, and of photography to Fox Talbot. Now, what is the real basis of photography as we know it now? Not the impressibility of the silver haloids to light, but the possibility of developing a latent and invisible image produced by a comparatively brief exposure; and this discovery, though constantly attributed to Talbot, is certainly due to Reade. Those who may desire to see the evidence will find it in Hunt's *Researches on Light*, second edition.

Those who work with gelatine emulsions will encounter one serious annoyance which I experienced in working another gelatine process I used some years ago. Any small objects floating in the air that settle on a gelatine plate during any stage of the operations—either the making of the plate, or the washing or drying of the negative—become firmly embedded in the gelatine, and injure the negative. This does not happen with collodion, which has no adhesive properties. One does not appreciate the many valuable qualities of collodion until one works with something else. The slow drying of gelatine exposes it to much danger from which collodion is free.

Another trouble with gelatine is that it does not adhere well to the plate. This statement will possibly cause some surprise, but it is true. The adhesion of good varnish to glass is very strong—far greater than that of gelatine. When a collodion film is properly varnished the varnish makes a smooth and even film over the glass in which the collodion is embedded; and I have never seen a film leave the glass except in one or two cases, when part was stopped out with colour mixed with gum, which last substance caused the varnish under it to loosen its hold. But gelatine does not hold well to glass; I have seen it separate in great flakes. Gelatine films are also more exposed to danger from atmospheric changes than collodion, and in printing in very damp weather there might be some danger of adhesion to the paper. This last difficulty could not be satisfactorily removed by varnishing. I have always been afraid to varnish my gelatine plates, of which I have some that I value very much. Varnish, of course, does not penetrate gelatine, but forms a second film on top of it, and thus we have two unequal expansions and contractions by changes of temperature and hygrometric condition, with danger of splitting in consequence.

Herr Obernetter has lately published a so-called "dust process," which is but a slight modification of one that I published in THE BRITISH JOURNAL OF PHOTOGRAPHY nine years ago. This process of mine has had a peculiar history. A year or two after its publication it was brought forward in Berlin, without the slightest modification, and attracted much attention; subsequently it was *patented in England* by a well-known photographic firm; and now it is brought forward, a little modified, by Herr Obernetter, who, as I see it stated, has received a gold medal for it from the Photographic Society of Vienna. My process consisted in coating paper or glass with gelatine and bichromate, exposing and applying pigment in powder, which adhered to the part that had not been acted upon by light. This process, which was absolutely original, and a step in a new direction, will be found described in full, with all its details, in the Journal for 1865, at page 216. As a proof of its delicacy of rendering I made some prints with it from transparent positives made from American bank notes. On these bank notes there are vignettes in the highest style of steel engraving, one protection from counterfeiting being supposed to lie in the difficulty of imitating the extreme fineness of the work. The most delicate work of this or any other sort was perfectly reproduced. I sent a specimen of this printing along with the article, and the Editors of The British Journal of Photography appended to the article the following note:—

"The carbon photographic picture taken by the above process, and forwarded to us by our esteemed fellow-labourer, is a copy of an ordinary American bank note. The fine lines of the engraving are rendered with wonderful precision—equal, we should think, to the original; and the whites have a transparent softness something resembling ivory."

In making these prints I allowed them to soak in water for a day before applying the pigment, in order to dissolve the brownish colour produced by the action of light in the parts exposed to it. I have since seen that my process might be improved by mixing copper sulphate with the bichromate, which has the remarkable property of preventing this browning, and thus this long soaking would become unnecessary. This peculiarity of the action of copper was first noticed by Hunt, and I have frequently had occasion to see the correctness of his description. By mixing in proper proportions the colouring may be always prevented. I was able to add an interesting observation to Hunt's statements, viz., that the bichromate and the copper salt should be separated, dissolved, and *mixed cold.* By neglecting this precaution I have seen the mixture brown as deeply in the sunshine as if the bichromate had been used alone.

Were I now to repeat my process of 1865 I should certainly use this modification; but when I want to copy by contact I prefer a dry plate. The albumen emulsion process which I have lately published gives splendid transparencies. It is better adapted for this purpose than any other method, because any desired degree of density may be obtained by simply continuing the development. There seems to be no limit to the strength which can be got by the alkaline developer alone. Doubtless the albumen is the cause of this, and also the fact that, by getting rid of the washing, so much silver albuminate is formed in the film. No dry process I have ever tried is so completely under the control of the development as this.

Dr. Schulz-Sellack, in an interesting article in the April number of the *Berichte* of the Chemical Society of Berlin, opposes the views lately expressed by Dr. Vogel on the sensitiveness of silver bromide in contact with colouring matters, reaching this conclusion from a different side from that which I took some time back in your columns. Dr. Schulz-Sellack is of opinion that all substances sensitive to light are influenced by those rays, which they absorb. If, therefore, it be found that silver bromide, when placed in contact with coralline for instance, is rendered more sensitive than before to rays which coralline absorbs, he holds that Dr. Vogel is wrong in ascribing this change to an influence produced directly by the coralline on the bromide but is of opinion that *coralline must itself be sensitive to light*, and that when so influenced it reacts upon the silver bromide, which is thus indirectly, instead of directly, acted upon. He concludes, therefore, that Dr. Vogel's experiments, instead of confuting his views, as held by that photo-chemist, really confirm them.

But I must here remark that the theories of both Schulz-Sellack and Vogel quite fail to explain the effect produced on silver bromide by the contact of *colourless* substances. I ascertained that several of these, and especially salicine, were as powerful to modify the sensitiveness of silver bromide to particular rays as any coloured substance. Salicine, in fact, was more energetic than any coloured substance tried in heightening the sensitiveness of the less refrangible rays. It will be recollected by those who may have read my first paper that my experiments were not undertaken to support any particular theory, but simply to get at the facts as a first foundation. Nor do I think we are yet in a position to form a satisfactory theory, and the facts are certainly at variance with any that have yet been proposed.

As respects the sensitiveness of silver bromide Schulz-Sellack recals the fact that he pointed out some time since that the sensitiveness of the bromide is greatly altered by the presence of even a small quantity of iodide; that it is sufficient if the bromide plate have been sensitised in a nitrate bath that has previously been used with iodo-bromised collodion, for the silver iodide which is dissolved by the bath is enough to give the bromide film different properties from those which it would have if prepared in a new silver bath. M. Carey Lea.

Philadelphia, May 8, 1874.

Albumen Chloro-Bromide Process.—Use of Potassium Nitrite.

In continuing to work with this new process I have found a further advantage gained by the introduction of potassium nitrite into the collodion. It has long been known in the wet process that silver nitrate when fused was apt to contain a small quantity of nitrite, and that its behaviour was, in such case, materially modified. This fact led me to experiment with the introduction of nitrite in larger proportion, and I found its action beneficial in increase of sensitiveness and of vigour.

Potassium nitrite may be obtained commercially, or is easily prepared in several ways. The most satisfactory mode consists in placing copper cuttings in a retort and treating them with nitric acid. The red fumes produced are conducted into a solution of potassium carbonate as long as effervescence takes place, and the solution is evaporated gently until dry.

Potassium nitrite is only slightly soluble in alcohol; but there is no difficulty in getting a grain or two dissolved in an ounce of collodion by reducing it to fine powder and boiling with alcohol. The nitrite obtained in the manner above described (I prepared my own in that way) is never pure, being always contaminated with nitrate; but it is sufficiently so for the purpose. It would be advantageous, however, to have a nitrite more soluble in alcohol, and for that purpose the *manganese* salt might probably be found useful. It is obtained by passing the red vapours just mentioned through water in which is diffused manganese carbonate.

In proposing to add unusual substances—such as a cobalt chloride (in previous paper), and now potassium nitrite—to the collodion I am aware that I render the process less attractive to some. It is also to be said that these additions are, in fact, very unimportant compared with such capital points as the introduction of albumen into the emulsion process and the suppression of the intermediate washing. Those who want everything in its simplest form can make a collodion with cadmium bromide only—about nine grains to the ounce of the dried salt, and add two drops of *aqua regia* to each ounce just before sensitising with silver nitrate. This sensitising is to be done with a very large excess of silver nitrate, according to the principle which I have established that the silver salt must vary according to the sensitiveness of the preservative, and that the general character of the preservative will depend upon its least sensitive constituent.* So that with albumen we need a heavy dose of silver nitrate. For a collodion containing nine grains of dried cadmium bromide to the ounce there should be twenty-two or twenty-three grains of silver nitrate.

With an emulsion so made and plunged direct into a bath of gum and sugar, with albumen and gallic acid, plates of most remarkable properties are obtained, such as really need no heightening in any way. But, again, those who are willing to take a slight amount of extra trouble in order to increase the excellence and the certainty of the results will find it worth while to add the cobalt chloride and the potassium nitrate, raising the silver nitrate to twenty-five grains when these substances are used. As respects *tannin* in the preservative bath, such good results are got both with it and without it that farther experience will be required to pronounce with certainty.

A few days ago, in preparing my albumen bath with gallic and tannic acids, I was surprised to find a quantity of flocculent, whitish precipitate formed, which ruined the bath, and would have spoiled it, even if filtered, for it was evident that a large portion of the albumen was thus removed. After a little examination I ascertained that this bath must be prepared by adding the ingredients in *a certain definite order* of sequence, viz., as follows:—*Water, gum and sugar solution, albumen solution, gallic acid solution, tannin solution.* Added in this order no precipitate falls. The liquid is not quite clear, but shows a little opalescence, probably due to the tannin; it is then in excellent order for the plates. But if the constituents are added in the following order—water, gum and sugar solution, tannin solution, gallic acid solution, albumen solution—then a heavy precipitate, as already described, is produced. Other orders of succession produce intermediate results; those orders that I have mentioned produce the best and the worst. It is possible that if carbolic acid were not used to keep the solution of gum and sugar, and that of tannin, from spoiling the precipitate would not result. This is a plan I have not tried.

These albumen plates made without washing *exhibit a still greater degree of sensitiveness when not fully dry.* This leads me to believe that my albumen plates can be used with advantage as wet plates—a matter which I expect shortly to test by experiment.

It is remarkable that the negatives obtained by this process do not in the least resemble ordinary dry-plate negatives, but would be taken for

* I proved years ago that, when preservatives of different degrees of sensitiveness are mixed, the action of the mixture will be intermediate between the two, inclining to that of the least sensitive.

negatives made with wet plates and sensitised in the ordinary way. The substance of the negative is light, not dark, and the details and whole picture show by reflected light.

My own results with this system of working continue to be so satisfactory that I do not ever expect to return to the older methods. I have not hitherto supposed it possible that dry-plate work could yield such negatives. M. Carey Lea.

The Alsace-Lorraine Fund Exhibition.—Spots and their Causes.—Mr. Stillman's Box-Tent.—Letter from Mr. R. M. Gordon.

In my letter of last week I alluded to the fine collection of modern paintings now on view at the *Palais de l'Industrie* in Paris. There is another exhibition also open now which visitors to that gay capital should certainly go and see. It is called the Alsace-Lorraine Fund Exhibition, and has been got up for the charitable purpose of raising funds to enable discontented patriots to emigrate from the two lost provinces, and settle as colonists in Algeria. The collection contains works both by old and modern masters, as well as objects of *virtu;* and the Duc d'Aumale, the Duchesse de Galiera, the Comtesse Duchatel, and the Rothschild family have lent many art-treasures. The celebrated French artists, Greuze, Decamps, Ingres, Delaroche, Delacroix, Madame le Brun, and Horace Vernet are well represented, nor are works by Watteau, Ary Scheffer, Gérome, &c., wanting. But the painting which will, perhaps, most interest professional photographers is a portrait, by David, of the Marquise d'Orvilliers, which is said literally to stand out from the canvas. Two other portraits also are remarkable, viz., that of Madame de Stael and that of Madame Récamier, the mistress of Chateaubriand—a most lovely woman—both by Gerard.

Since my arrival in England I have received a great many letters on the subject of the bromide process with the bath, carbon printing upon glass, and neôleo-peinture, most of which contain inquiries as to difficulties in the above processes. One received this morning from Mr. Brogden, of Bridgend, Glamorganshire, has some remarks which I will venture to quote. The writer says:—

"I notice in The British Journal of Photography, May 8th, you refer to your having some surprise that more amateurs do not take up the bromide process with the bath. I think it is more likely many are at work upon it, but do not write to the Journal. I myself, and I know two others, were convinced on your first letter, and have been at work upon it for two years or more. Wet and with albumen organifier it is easy enough; but there seems more difficulties when dry plates are made. I find if a collodion with any tendency to spots work pretty well wet, when dry they seem to crop up in a most annoying style. I have no doubt you have had an amount of experience in spots. I have been very much troubled with them lately. Filtering the collodion only seems to stir something up which I cannot detect by magnifying the collodion in a liquid state or dry. It would be a most instructive letter if you would give your views on these abominations in the Journal some time."

The best reply I can make to this letter is to suggest that the spots upon the dry film before exposure, and also upon the finished negative, be examined under a microscope in order that their form may give a clue to their origin. They may proceed from particles in the collodion, or in the nitrate bath, or in the organifier; or they may proceed from dust which sticks to the film whilst drying and becomes imbedded in it; or they may be crystals of bromo-nitrate of silver; or undissolved particles of pyrogallol or carbonate of ammonia; or in the potassium-bromide solution.

Particles in the collodion may be avoided by using a capital collodion pouring-bottle which consists of two parts, the upper part being ground into the lower, and having a conical-shaped bottom with a small hole through which the particles fall into the lower vessel. Several dealers supply them, and I can recommend them strongly.

The nitrate bath and all the other solutions should be filtered; but, as I have found to my cost, certain kinds of filtering-paper make more particles than there were before in the solution. One day last autumn, whilst taking a view of a chemist's shop in Redon by the common wet process in a tent in his yard, with a bath which he had filtered for me, my first two negatives were badly troubled with comets; so the bath was filtered again, but still the same troublesome comets. I next filtered it through a different kind of paper, and all went right at once.

Crystals of bromo-nitrate of silver, produced by a very strong old bath containing a good deal of ether and alcohol, may be shown in perfection upon a dry unwashed film; but I do not think they can occasion spots upon a *washed* film, because water would not only remove them, but decompose them into silver nitrate and silver bromide.

My own belief is that the spots with which dry plates are so commonly troubled generally proceed from particles of dust which stick to the film during the process of drying, and which become so firmly imbedded in it that they cannot be removed; and I am fortified in this opinion by the fact that both wet and moist films are comparatively free from them.

Impure washing water may be a cause of spots. It is a well-known fact that if a few grains of loaf sugar be added to a pint of water which contains sewage matter there will be formed in the water small cells and strings which may be seen with the aid of a microscope. I have seen some curious developments of this sort in old aqueous solutions of bromide of potassium. Spots may also be produced by the development of germs or spores in long-kept dry films.

Opticians should bring out a neat little portable microscope especially adapted for the examination of spots in our films. This is one of our wants which opticians are so very slow to supply.*

I have only to add that spots may sometimes proceed from tobacco-smoke in the dark room.

No man, perhaps, has done battle more successfully with spots upon films than Mr. R. M. Gordon, and he used to prepare his plates during the small hours of the morning when the rest of the world was asleep, and the dust at rest also.

And this reminds me that I have lately received an amusing and instructive letter from that gentleman, who is now in Portugal, taking instantaneous negatives by the common wet process.

He speaks in terms of great delight of Mr. Stillman's box-tent, which he is now using. My readers have already had a description of it in this Journal. The head is always outside the box, the eyes being pressed against a velvet shield, and the hands thrust inside through a pair of sleeves fitted with elastic bands. Mr. Stillman was once kind enough to show me one of his boxes at his own house, and it seemed to be a marvel of ingenuity and completeness, no point having been left unconsidered. That so thoroughly practical a man as Mr. Gordon should now be actually using it with comfort is its best recommendation.

One remark of Mr. Gordon's is very funny. He says he hates the rapid collodio-bromide process as much as he hates Spanish three-per-cents. He alludes, of course, to rapid emulsions. No doubt he will be glad to hear of Colonel Stuart Wortley's recent improvement in the method, whereby he has at length combined the rapidity of the common wet process with printing density in the negative. Mr. Gordon adds that for a tour, such as he took with me in my yacht in Brittany, he believes there is nothing to touch his own dry process. I hear through a mutual friend that he is just now very much troubled with impure water in Portugal, and has had to set up a still.

Stoak Vicarage, near Chester, Thomas Sutton, B.A.
May 23, 1874.

SENSITISED GELATINO-PELLICLE.

To the Editors.

Gentlemen,—A request has been made by Dr. Nicol to those who may have tried my sensitised pellicle to give their experiences of the same—good, bad, or indifferent. It is very plain, however, that Dr. Nicol has had but a very indifferent experience of it himself, either in the number of trials made or in the way in which he made them. Notwithstanding, I thank him for bringing the matter forward, as by so doing it enables me to point out wherein he has failed, and probably others also from like causes, consequently the same precautions will apply to all.

The first mistake made the writer points out himself, *i.e.*, he coated the plates too thickly. Even that I can hardly understand, as I never find I get my films too thick, and I use forty grains of the pellicle to the ounce of water, that being the quantity allowed in the packets to each ounce of water. I presume Dr. Nicol either used it too cold or poured it on a cold plate, and so at once chilled it. I always take the chill off my glasses before pouring on the emulsion in one of the following ways—namely, holding them over a lamp, placing them on a hot-water dish, or placing a glass plate over a basin of hot water, then placing the plate to be warmed on it. This facilitates the operation, and gives a better adherence of the film to the glass. I also warm the glass rod by which I guide the emulsion over the plate, as by so doing less of the solution adheres to it.

Dr. Nicol goes on to say that he at length got the plates coated all right, and which dried in about twenty-four hours. Now that was

* Microscopes, of both a single and compound kind, suitable for this purpose are extensively sold, at least in all large towns, and at a very low price.—Eds.

about twenty hours too long in drying. Mine always dry in from three and a-half to five hours, at a temperature of about 65°. I find the quicker they dry the less liability there is to failure in any way and the less chance of light and dust; and as I point out that the emulsion will keep good for only a very short time, there is less chance of an incipient decomposition commencing. In the case of the plate mentioned it had, in my opinion, got to a very advanced stage of decomposition, and which Dr. Nicol calls a structural arrangement of the gelatine. Opinions differ, however, for I should call it *dis*arrangement. We must now take the thing as it stands:—Time of making the emulsion to coating the plates not named; twenty-four hours' drying; again some days' drying after fixing—say the least time forty-eight hours; that makes seventy-two hours that the gelatine must have been in a moist state.

How it is that the films take so long to dry in Scotland would be an interesting matter for inquiry. I was making some transparencies on Saturday last, and took particular notice of the time of drying. After the final wash the time was just over one hour; the longest time taken was under one hour and a-half. I have dried them in about ten minutes, as several gentlemen can vouch, they having seen me expose, develope, and dry them, and they have taken them away. They may be dried rapidly by holding them some three or four feet from the fire. I do not advise this kind of drying when there is time to dry spontaneously. Neither should the first drying take longer than five or six hours.

Now, the cause of Dr. Nicol's failures I take to be—first, the film was kept too long in a moist state before drying; and, secondly, I think from the frilling of the edges there was too much acid used in the intensifier. There should be only sufficient acid to prevent the intensifier from becoming muddy when the silver is added to it. I have just opened a fresh bottle of acid, which I find to be much stronger than that I have been using. The quantity in my instructions are probably, from this cause, too much; but a frilling or loosening of the edges are certain proofs that acid in too great a quantity is being used. In such case more pyro. and water should be added to the solution; there will then be no loosening of the film in any way. The greatest difficulty to encounter, should the glass be wanted, will be to get rid of the film.

In conclusion: I, like Dr. Nicol, wish and invite all those gentlemen who have had and made trial of the pellicle to give their experience of it—whether that be good, bad, or indifferent. Of the fact that it can be worked, when the conditions necessary are complied with, I have good evidence, and shall be very much pleased to show to any gentleman who may feel at all interested the working of the process, and also what has been, and can be, done with it.—I am, yours, &c.,

May 26, 1874. R. Kennett.

COLLODIO-BROMIDE WITHOUT FREE SILVER.

To the Editors.

Gentlemen,—Mr. Stillman's note on *Collodio-Bromide without Free Silver* calls for a word from me in confirmation as well as explanation.

It is quite true that Mr. Stillman's emulsion, which I kept several months before preparing the plates he alludes to, was much quicker than those I made to compare it with, and that in many respects it left nothing to be desired; but I found it very difficult to intensify—in fact, impossible—without using silver, and of such a character that the public would hardly care to exchange its advantages for those which a less sensitive emulsion gives.

Mr. Stillman's later experiments seem to me of much greater promise, and I am happy to be able to say that we have secured the result of them for the Liverpool Dry-Plate Company.—I am, yours, &c.,

St. John's Hill, Wandsworth, S. W., Peter Mawdsley.
May 26, 1874.

THE COLLODIO-CHLORIDE PROCESS.

To the Editors.

Gentlemen,—It is a pity that Mr. Hooper, previous to reading his paper on collodio-chloride at the last meeting of the London Photographic Society, had not considered it worth his while to make himself acquainted with the history of that process.

In his desire to do a service to his next-door neighbour, Mr. Simpson, he strangely overlooked the fact that it is not to Mr. Simpson at all, but to the late M. Gaudin, we are indebted for the collodio-chloride process.

M. Gaudin published (in 1861) quite enough to have enabled any really intelligent experimentalist to succeed perfectly with the process when applied to paper, long before Mr. Simpson "discovered," in 1865, what had previously been published—even in the *Photographic News;* while but for Mr. Bovey, as now admitted by Mr. Simpson, the process was quite inapplicable to glass.

To M. Gaudin, then, is due all the credit of the invention and application of collodio-chloride to paper, and to Mr. Bovey that of its application to opal glass. Why, then, did Mr. Hooper presume to place Mr. Simpson in such a false position, and make such absurd claims for him?

It is said that Mr. Simpson obtained his American degree of M.A. (through Professor Towler) for his alleged "discovery" of collodio-chloride. Now that M. Gaudin is dead, it was to be expected that Mr. Simpson would be prompt in transferring the honour to Mr. Bovey. It may be hoped that at some future period Mr. Simpson will prove fortunate in making a *veritable* discovery entitling him to wear a titular honour with credit should a well-founded mark of distinction be conferred upon him.—I am, yours, &c.,

49, *King William-street, E.C.,* A. L. Henderson.
May 26, 1874.

[Although the earlier readers of the Journal are doubtless already well aware of the true history of the invention or discovery of the collodio-chloride process (which we have all along admitted in the fullest possible manner to be a French and not an English invention), yet, in consequence of untenable claims being again advanced, by the aid of a *locum tenens*, on behalf of a gentleman who has long since been *proved* (see vol. xiv., page 385, of this Journal) to have been anticipated by some years in this field of discovery, we cannot permit the paper read by Mr. Hooper to appear in our columns without publishing one of several energetic protests made against the claim once more attempted to be set up in connection with this process.—Eds.]

ERRATA.

To the Editors.

Gentlemen,—In my note in last week's Journal your proof reader made me say "the value of hydrochloric acid in giving density is inconceivable," when I wrote "incontestable;" and in another sentence he changed my meaning by transferring a comma to the wrong place. I wrote "while a film washed only till water would flow over it, though it was highly charged with nitrate on being poured, showed no evidence of it," &c., but the proof reader put the comma after "nitrate" instead of after "poured," which changes altogether the meaning of the sentence.—I am, yours, &c., W. J. Stillman.

8, *Altenburg-gardens, Clapham-common, S. W.,*
May 26, 1874.

THE MOIST PROCESS.

To the Editors.

Gentlemen,—The letter of "Buenos Ayres" in this week's Journal is but one example of many who have come to grief with Mr. Sutton's moist process; and even those who, like myself, have worked it with tolerable success find at times a stoppage from some cause or other, whose only remedy is found to be a new bath and a start afresh.

My object in writing the present is humbly to suggest to Mr. Sutton the advisability of publishing another edition of his pamphlet (or through the medium of your Journal), containing the result of the various improvements made in the bromide and bromo-iodised moist films, with minute details of working—such as the proportions of strong alkaline developers, and the appearance of the film under that and pyro. development—as a guide to those who are not *au fait* when to stop; in fact, an epitome of all that has been learnt since, and which is scattered throughout your Journal, together with a chapter on defects and failures, with their causes, remedies, and prevention, to form at once a ready handbook for his disciples, especially those who, like "Buenos Ayres," are at sea.—I am, yours, &c., J. H. Waite.

Cawood, May 25, 1874.

THE FERRANTI-TURNER DISPUTE.

"The very head and front of my offending
Hath this extent, no more."—*Othello.*

To the Editors.

Gentlemen,—Mr. Ferranti in your last issue was good enough to mention me by name as of the number of his friends—a circumstance which makes it difficult to understand his publicly stigmatising me as an "unscrupulous individual" without having previously sought from myself some explanation of the circumstance which has offended him, and which, as will presently be made manifest, is readily explicable without resorting to the supposition of dishonour. To describe a man as an unscrupulous person and a friend is to give ground for an inference which your correspondent must have overlooked. Anyway, it is clear that less haste and more judgment would have been attended with advantages.

Mr. Ferranti has both publicly and privately denied Mr. Brothers' right to execute pictures by his process for any photographer whatever, and he has both publicly and privately admitted that the right in question does, after all, exist. The reconciliation of this contradiction is impossible; and if an explanation of its origin be sought, two hypotheses alone suggest themselves—to wit, the hypotheses of dishonour and the assumption of inadvertence or misadventure. Were I to follow the example of Mr. Ferranti I should at once pitch upon the former, whereas by selecting the latter I have attributed his errors to a cause the operation of which he seems unwilling to regard as possible in the instance of a few circulars only enclosed in the wrong covers, at a time when I had occasion to make an immediate issue of a number approaching two thousand, and relating to other matters connected with our art. But surely nothing further need be said in explanation of so trivial a circumstance. No one will believe that a sane man would deliberately issue an announcement that he was prepared for the wholesale infringement of a patent—at any rate of a patent which is assumed to be valid.

"The fox barks not when he would steal a lamb."

At the same time, although I have no intention of executing Ferranti-Turner pictures for those who reside out of the district over which, through my arrangement with Mr. Brothers, I have the exclusive right, I am not at all sure that by so doing I should exceed the rights and privileges with which I have been vested. The first licensees of the process in question—a firm whose rights were purchased on the 8th October, 1872—happened to reside and do business at a watering place, supported by the finances of the dwellers at a distance; it would be idle to contend that their privileges were curtailed to the residents of the town, and unjust to Mr. Brothers and myself to deny us the same rights over distant ground which other licensees enjoy.

Whether those to whom we sell have or have not the right to sell again is a matter distinct from the subject of the present correspondence; but to me one point seems clear—that, so long as we execute only such orders as are legally received within our district, we are not *bound* to trouble ourselves about the occupation or the residence of those who give them.

It strikes me that in the present correspondence "much ado" is being made "about nothing;" and I would therefore remark, in conclusion, that unless some points of real interest are advanced, I shall withdraw from a controversy which already savours far too much of an attempt at gratuitous advertisement.—I am, yours, &c., D. WINSTANLEY.

Blackpool, May 25, 1874.

To the EDITORS.

GENTLEMEN,—It is evident Mr. Ferranti wishes to make it appear that no one is right but himself. As soon as it was made known to me by Mr. Ferranti that circulars had been sent beyond my district, I wrote to him in the words which he quotes—a sufficient acknowledgment, surely, that there had been an inadvertence on Mr. Winstanley's part; and my letters were sent *before* the appearance of Mr. Ferranti's "caution." That "caution" says:—"No licensee is at liberty to work for other photographers in his or other towns." This is absolutely incorrect, so far as I am concerned. I have the right, and have disposed of it to Mr. Winstanley, and Mr. Ferranti does not now dare to dispute this point.

Mr. Ferranti knew, or should have known, what rights he sold to me; and yet he did not hesitate to stigmatise me, in his first letter, as an "unscrupulous individual." For the publication of his caution, and the use of the words just referred to as applied to me, I have clearly a right to an apology from Mr. Ferranti in the Journal.

I regret occupying your space with a personal matter, but your readers will at once see that I must defend myself against one who has rushed too hastily into print.—I am, yours, &c., A. BROTHERS.

Manchester, May 23, 1874.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPHS REGISTERED.—

J. Werge, London—*Photograph entitled "Cat's Cradle."*

W. Gothard, Wakefield.—*Two Portraits of T. K. Sanderson. M.P.*

Roberton Thompson, Liverpool.—*Three Portraits of Father Nugent.*

M. B. Wynne. Melton Mowbray.—*Copy of Pencil Drawing of Mastiff, by Harrison Weir.*

B. W. Bentley, Buxton.—*Two Portraits each of the Duke of Devonshire, Lord Edward Cavendish, and George Drewry, Esq.*

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

⁂ Contributors must still bear with us in the present crowded state of our columns.

A. L. STEAVENSON.—We shall notice your suggestion next week.

S. M.—Acetic, and *not* nitric, acid must be employed for acidifying the albumen negative bath.

JOSEPH BOWMAN.—Apply to Messrs. Mawson and Swan; also see a leading article in the present number.

C. PEARSON.—There is no work specially devoted to landscape photography. Many useful hints are to be found in the manual by Mr. Lake Price.

A. C.—The experiment will only succeed when the conditions laid down by our correspondent are strictly adhered to; that is, primarily, emulsion and not bath plates.

E. H. B.—Make a solution of caustic potash, and pour of this sufficient into the solution of nitrate of silver to precipitate the whole of the silver as oxide. Then add water, and as soon as the oxide falls to the bottom decant the clear liquid and refill with plain water, repeating this several times. The oxide thus obtained and washed may be added to the bath, leaving it in a slightly alkaline condition.

B. B. L.—To test for excess of silver or of bromide pour a small quantity of emulsion into an ounce of distilled water; then filter it, divide the filtrate into two parts, to one of which add a drop or two of hydrochloric acid, when, if free nitrate be present, a white precipitate will be thrown down. To the other part add a few drops of a solution of nitrate of silver, which, if free soluble bromide be present, will cause a precipitate.

F. J. W.—This correspondent says:—"I have lately precipitated from an old bath some silver (in the metallic form with copper). Will it be possible to reconvert it into nitrate of silver? and, if so, how?"——The precipitate, being metallic silver, is soluble in nitric acid, which, however, ought to be slightly diluted with water. The resulting solution is nitrate of silver. Upon evaporating the solution crystallisation will result.

G. F. S.—Nitrate of silver is one of the purest salts in the market. The low price at which it is sold, and the exceedingly small profit obtained by vending it, coupled with its great purity, indisputably attest the honour and honesty of photographic dealers in this country; for we have never heard of a charge being made against one of them for adulterating this substance, notwithstanding the fact that adulteration might be so easily practised as to be extremely difficult of detection.

ENGINEER.—A simple and really excellent way by which to fume printing-paper, should you have no properly-constructed fuming-box, is to provide a flat dish (rather larger than the sheet of paper to be fumed) with a flat wooden cover large enough to rest on the edge of the dish. Attach, by pins or otherwise, the paper to the cover, pour into the vessel sufficient diluted ammonia to cover the bottom, and then place the cover over it, the paper being, of course, downwards. Leave it thus for about ten minutes.

W. S. HUSKISSON.—This correspondent complains that liquid ammonia in the alkaline developer makes it turn dark brown immediately, and yield foggy negatives. He probably adds too many drops, and does not restrain its action with the bromide of potassium solution. Mr. Sutton's pyrogallic intensifier and developer for moist plates is made thus:—

Pyrogallol	2 grains,
Acetic acid	40 minims,
Water	1 ounce,

to which are added a few drops of a thirty-grain solution of nitrate of silver. Mr. Sutton has not yet tried your self-developing organifier, having been for two months away from home.

T. J. F.—The simplest way to obtain a raised block for printing at a typographic press will be to write upon lithographic transfer-paper with a suitable ink, transfer to a polished zinc plate, ink well up with a strong ink, and then etch away the surface so as to leave the writing in relief. To do this deeply and without under-cutting requires, however, a good deal of skill; and there are numerous so-called "secrets" connected with this special department. Another method of procedure is to obtain a negative of the writing, print from it upon a bichromatised gelatine film spread upon glass, convert this into a relief by immersion in water, and obtain from it a cast by means of any of the recognised methods. We have by the latter mode reproduced printed matter and engravings on so reduced a scale as to render it impossible to read the typographic reproduction without the aid of a powerful magnifying glass.

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

ROYAL APPRECIATION OF PHOTOGRAPHY.—Her Majesty the Queen has been pleased to present Mr. J. Thomson with a handsome gold medal, as an acknowledgment of her appreciation of his work, *Illustrations of China and its People*, the last volume of which has just been published. A notice of the volume will appear in our next number.

METEOROLOGICAL REPORT,

For the Week ending May 27, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
21	30·07	E	49	53	65	42	Fine
22	29·66	SE	54	58	72	42	Fine
23	29·54	NE	53	55	74	52	Dull
26	29·96	E	54	58	70	50	Fine
27	30·01	SE	54	58	74	51	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 735. Vol. XXI.—JUNE 5, 1874.

ON TANNIN.

Since the introduction of Major Russell's tannin process in 1861, down to the present day, tannic acid has been an object of considerable interest to photographers, and more especially since the publication by Sayce and Bolton of the collodio-bromide emulsion, in connection with which it has always played a conspicuous part.

In nearly all the dry processes which have been introduced the application of organic matter of some kind has been necessary, both for the purpose of keeping the structure of the film in a condition suitable for development, and to enable it to acquire under the action of the developer sufficient printing density. Of these organifiers, sensitisers, or by whatever other name our readers may be pleased to recognise them, tannin has few equals and fewer superiors, and in the hands of those who by perseverance have overcome the trifling difficulties incident to its use, it has given results quite equal to anything to be got with wet collodion.

Notwithstanding this, however, we are aware that many careful manipulators have encountered much difficulty in its use, and have only succeeded by the addition of honey, sugar, or some similar substance; while others have altogether abandoned it for something less useful but more easily worked. Having a high opinion of tannin as an organifier, and believing that the difficulties experienced by many are not inherent in the thing itself, but arise from the kind and quality of the sample used, we think a brief article on its nature and properties may be of use to our readers.

Tannin, then, or tannic acid, is one of the most widely-distributed of the carbon compounds, and forms the astringent principle in almost all vegetable matter; those plants, according to Wagner, which have milky juice (such as the *Taraxacum officinale*, the *Ficus euphorbia*, &c.), being almost the only exceptions. Tannic acids, however, prepared from various sources, have very different qualities—some of them entering into union with certain animal solutions and fibre, and giving black tannates of iron with ferric salts, while others have no action on animal matter, and form green precipitates with the ferric salts. For our purpose we may take Wagner's division into two classes—the *pathological* and *physiological* varieties. The first is the produce of abnormal or diseased tissue, such as the gall nut; the second is found in the healthy bark or fibre of the oak, willow, &c., &c. The first or pathological variety is that which ought only to be used by photographers, and with which we alone have to do.

The production of the gall nut, as most of our readers are aware, is the result of a puncture by the female of the gall fly (the *Cynips gall tinctori)* in the stem or leaf of a species of oak (the *Quercus infectoria)*. In the puncture she deposits her eggs, along with an acrid liquor, which sets up an irritation in the part of the plant punctured. To allay or cure this irritation the plant sends large supplies of its juices, which form at first a coating round the eggs, and gradually increases till the size of the ordinary gall is attained. When the egg comes to maturity—or, rather, when the perfect insect is formed—it eats its way out, and the hole by which it escaped is easily seen in most of the galls in the market. The best galls, however, are those which have been collected before the insect had been transformed from the pupa state; they are denser, darker in colour, and richer in the substances which give them value.

According to the analysis of Pelouze, the gall nut contains, in 100 parts, *tannic acid*, 40·0; *gallic acid*, 3·5; *ellagic acid* and *insoluble matter*, 50·; *colouring matter*, 6·5 = 100·0. The substance called "ellag" was discovered by Braconnot, whose imagination must have been very limited, as he could get no better name for it than that of the French *galle* spelt backwards. Pelouze's analysis, however, is only correct in the case of galls which have been kept for a considerable time. From fresh nuts English manufacturers readily obtain from fifty to sixty per cent., and sometimes more, of tannic acid; and we have no doubt that, by long keeping, a portion of the tannic acid originally present is, by a peculiar ferment present in the gall, converted into ellagic and gallic acids.

The process for the manufacture of tannic acid adopted in this country is extremely simple. The powdered gall nuts is packed in a conical percolator, the narrow end of which is loosely plugged with cotton wool. For this purpose gun-cotton will be found much better than ordinary cotton, as it does not run, or felt together in lumps. Over the powder is poured ordinary sulphuric ether; that is, ether containing about ten per cent. of water. This slowly passes through, dissolving, and carrying with it, the tannic, gallic, and ellagic acids, with some fat and colouring matter. The ether is passed till the powder is exhausted, and, after standing in the receiver for a short time, it is found to have separated into two layers—the upper of which is ether holding in solution the gallic and ellagic acids, and the lower a strong aqueous solution of tannic acid. Generally the ethereal stratum is carefully removed, and the aqueous solution evaporated in vacuo to a syrupy consistence, then spread on porcelain slabs and dried at a gentle heat, when it is scraped off, and has the appearance with which our readers are familiar.

Tannic acid thus prepared dissolves readily in water; but it does not make a bright solution, as it contains a considerable quantity of chlorophyl and some fatty matter. To these and some other impurities we attribute much of the difficulty which has been experienced in working with this variety of tannin, as the fat is easily oxidised, and the new compounds thereby formed are very likely to injuriously affect a sensitive film. Some makers try to get rid, to a certain extent, of the fatty matter by repeated washing of the aqueous solution with anhydrous ether, and to a large extent they are successful, the tannin so produced being more readily dissolved, and yielding a much brighter solution, although not by any means as bright as it should be for delicate photographic work. This is known commercially as "soluble" tannin, and brings, of course, a higher price.

At the period when the tannin process was introduced its production was principally in the hands of English manufacturers, and its wholesale price was about ten shillings per pound. Now the great bulk of what is used is of continental make, and the price is less than half that sum; but the quality is undoubtedly inferior to the tannin we used to be able to obtain. Much of it, for the reasons already given, is unfit for photographic purposes. Only the *soluble* variety should be used, and even that is not always up to the mark.

We have made a number of experiments with a view to assist those of our readers who may not be able to secure a supply of the pure article to make the best of what they can obtain, and the following method will give a solution that answers well:—The commercial tannin is to be dissolved in a very little water, then about one-fourth the bulk of anhydrous ether is to be added, and the whole well shaken. The bottle should then be turned bottom up, and allowed to stand for half an hour, when the ether will be found floating on the top holding in solution most of the impurities, and leaving the tannin solution quite bright. If the cork is now slightly eased the lower stratum may be drawn off to nearly the last drop without disturbing the ether. The purification may be made almost perfect by subsequent filtration through pure animal charcoal.

We have somewhere seen a recommendation to let the solution of commercial tannin stand for some weeks before use, till it gets quite bright. This it will certainly do, but not in the way generally supposed by those who so advise. The fact is, that the same ferment which in the gall nut converts the tannin into gallic and ellagic acids acts in a somewhat similar way on the tannin solution, the tannic acid taking up a quantity of water, and being transformed into gallic acid and glucose, thus—

$$\underset{\text{Tannic acid.}}{C_{27}H_{22}O_{17}} + \underset{\text{Water.}}{4H_2O} = \underset{\text{Gallic acid.}}{3C_7H_6O_5} + \underset{\text{Glucose.}}{C_6H_{12}O_6}.$$

And probably a still further change may take place by the formation of alcohol or acetic acid and carbonic acid from the glucose. This fact points to the correction of another error which is very often committed; that is, the making of a large quantity of a tannin preservative, and, by the addition of carbolic acid or other antiseptic, using it over and over again and keeping it indefinitely. The decomposition which naturally takes place in such a solution will, we believe, go far to account for the many complaints, of which we have heard, of a decided success at first gradually being changed into as decided a failure, and in which the collodion, bath, or emulsion were in succession blamed, and changed without improvement in the results.

ON THE USE OF ALDEHYDE AS A DEVELOPER.

It would almost seem to be a superfluity in a publication like The British Journal of Photography to dwell to any extent upon the theory of developing; yet the actual theory is so little understood in detail that it is almost necessary, as a kind of an apology, to point out why the experiments that we intend to describe were undertaken.

A developer is a reducer. So far we are clear. But if we go further than this it is by no means easy to give an exact explanation of the phenomenon which occurs upon adding a developer to a plate containing upon its surface the latent image. We know also that a deoxidising agent, when reducing the iodides and bromides of silver, acts with much greater energy upon those molecules which have been submitted to the actinic influence. The molecules submitted to light have been so shaken in their stability that the reducer is able to exert its reducing action upon such portions of the plate in the cold.

The chemicals used in the developers may be conveniently divided into reducers (developers proper), accelerators, and retarders; thus the chief reducers are protosalts of iron and pyrogallic acid. Accelerators may aptly be applied to those substances—such as formic acid—which, although powerful reducing agents, are hardly capable of working well by themselves at ordinary temperatures, but are invaluable with other developers. Acetic acid may be viewed as the type of the third class—the retarders—which are capable of holding back the too rapid and energetic reducing action of the developer. When we begin carefully to examine into these designations we find that they are true to a certain degree. Thus citric acid is frequently and most generally used as a retarder or controller, but under certain conditions it acts as a reducer. This is particularly the case with the persalts of iron, which are reduced to their lower term by the actinic influence acting in connection with citric acid.

In some experiments upon the use of other reducing agents as developers than those generally employed, the following details in connection with aldehyde are worth recording—not only from their originality, but from their promising results; for, if equally promising experiments can be got from the numerous reducing agents with which the chemist is acquainted, no doubt valuable adjuncts may be obtained which will meet those peculiar phases of our art where temperature and local circumstances render the taking of a photograph something out of the ordinary groove. Now aldehyde is a reducer, and one which acts with considerable energy upon the silver salts; and this fact suggested some experiments on its effects upon the collodion film. We do not know if the action of aldehyde has anything to say to formulæ such as Colonel Stuart Wortley's developer, of which the following will convey an idea:—

Twenty ounces of sulphate of iron and half-an-ounce of acetate of lead are respectively dissolved in 120 ounces of water and five ounces of water. The two solutions are mixed, and, after standing some time, the clear solution is decanted from the precipitated sulphate of lead. So far, therefore, we have a solution of protosulphate of iron with a little of the protoacetate. To this bright solution of the ferrous salt is added the following mixture:—

Formic acid	5 ounces.
Acetic ether	1½ ounce.
Nitric ether	1½ „

Mix.

The acetic ether is the only substance that is not itself a powerful deoxidiser. At the time this formula was invented all the nitric ether in commerce contained large quantities of aldehyde; indeed, it is only of late that processes have been introduced into our pharmacopœia and elsewhere that gives a nitric ether—or rather, we should say, a nitrous ether—free from this substance. Now, we think that it is extremely probable that this nitric ether would wonderfully modify the action of the developer in such a mixture, because it will be perceived from our experiments that very small quantities of aldehyde act in connection with iron as powerful accelerators. It therefore first behoves us to consider what is this substance, aldehyde.

Aldehyde is a generic term which has been applied to a class of substances intermediate between the alcohols and the respective acids belonging to each alcohol. Thus, the acid derived from wood spirit (methylic alcohol) is formic acid, whilst the acid derived from ordinary alcohol (ethylic alcohol) is acetic acid; and we have the respective aldehydes as intermediate products of oxidation from the respective alcohols. (Methylic aldehyde has only lately been discovered by Hofmann.) They are generally derived by the abstraction of one molecule of hydrogen (H H). But what is generally understood by aldehyde is the first-discovered of these compounds, and the one best known, namely, the ethylic aldehyde (C_2H_4O)—a product which, although some few years ago a chemical curiosity, is now manufactured as an article of commerce.

Aldehyde is a thin, volatile, colourless liquid, possessing a most pungent odour and anæsthetic action. It boils at 20° to 22° C. It is perfectly neutral as regards its reaction upon litmus paper if properly purified; but as it gradually, but slowly, absorbs oxygen from the atmosphere, and is converted into acetic acid, it is rarely found quite free from acidity. It also, but not frequently, becomes converted when in closed vessels into modificates, which are crystalline or less volatile. In the presence of platinum black the conversion into acetic acid is instantly brought about. When the vapour is brought in contact with red hot potash or soda lime the same reaction is induced, and acetate of the alkali formed. Aldehyde reduces the noble metals from their compounds, particularly if ammonia be present.

There are three methods amongst many others by which aldehyde may be procured with comparative ease:—If alcohol be distilled with two parts of water and three of oil of vitriol until it begin to froth, the distillate will be found to be rich in aldehyde. It is also got by the action of chlorine upon a mixture of one part of alcohol and two of water. If one part of alcohol, one of bichromate of potassium, and one and three-quarters of oil of vitriol be distilled together, a large quantity of carbonic acid is evolved, and aldehyde will be found in the receiver if well cooled. To purify it the crude aldehyde obtained by any of the above processes is dissolved in ether and saturated with ammoniacal gas, the whole being surrounded by a freezing mixture. The aldehyde ammonia separates out in hard crystals.

We shall describe our experiments with this substance in an article in our next week's issue.

A correspondent in another page touches upon a matter which intimately affects both the reputation and the pockets of professional photographers, viz., the system of copying prints, which now prevails to a large extent, especially in the metropolis, where several establishments are to be found whose sole business is the production and supply of copies of photographs sent to them for that purpose. Now, as the law is altogether powerless to deal with copying—for no photographer can obtain legal protection for himself in connection with any portrait executed to order and paid for, unless under a formal deed—the question arises whether he may not protect himself by scientific means, and it is one possessing great interest at the present period. If certain marks, in the form of smears or crosses, be made upon the high lights and face of a portrait by a fluorescent body which leaves no mark perceptible to the eye, although palpably visible to the camera, then the problem is solved so far as copying, by cheap copyists, is concerned. If, as our Bradford correspondent at the last meeting of the British Association observed, a death's head and cross bones drawn with fluorescent yet invisible ink on the brow of a lady prevents the possibility of her portrait being taken, certainly this preventive would act much more forcibly and intensely when applied in a concentrated solution to a print. All that is required in practice is that a brush charged with a powerfully-fluorescent body should be passed over the face of the print, after which it will be difficult, if not impossible, to obtain a clean negative from a print treated in such a manner.

NOTES ON THE CHLORO-BROMIDE ALBUMEN PLATES.

There is one peculiarity noticeable in these plates which draws a broad distinction between them and all other dry plates. With dry plates in general the danger lies in over-development. I have seen many plates which, when held up to the light, looked fair enough, but which, when printed, proved to have been over-developed and gave harsh prints.

These new plates, on the contrary, have the very precious quality that there seems absolutely no danger of over-development. With most dry plates there is an anxious moment at which to stop; a fraction less gives a plate yielding a flat print, and a fraction more gives harsh results and too much contrast. But with these new albumen plates—I refer, of course, to those made without washing, as I have described—there is a remarkable latitude allowable. The development may be stopped at a given stage, and a good negative be had; or it may be continued for some time longer with a continued gain in density, and yet the high lights retain a due amount of transparency.

These negatives also print rapidly, even when dense enough to give very brilliant prints.

In character they have the well-known peculiarity of collodio-albumen negatives, namely, of showing a variety of half-tone; so that between the high lights and deep shadows there are many grades of tone.

The getting rid of the use of water for washing will remove many sources of failure from impure water, and will render this process peculiarly applicable for making plates on photographic journeys. I do not in the least doubt that the same principle which I have employed in this process is of tolerably general application, and that with many other preservative baths the washing is unnecessary and even injurious. But to experiment with them seemed mere waste of time; the albumen, when used in this way, and in conjunction with gallic acid, pyrogallic acid, &c., gives such superior results that to work with the older preservative mixtures would be simply to retrograde.

As respects gallic and pyrogallic acids, they stand very nearly together; both give excellent results. On the whole, I am disposed to give a slight preference to gallic acid when used with the large proportion of silver which the albumen renders necessary. The addition of tannin seems, perhaps, beneficial.

I find that the albumen bath, when used for a considerable succession of plates, dissolves out more silver than I at first supposed, though not more than an ordinary preservative bath used *after washing*. To avoid loss of time it is necessary to have at least two baths into which to slip the plates, and when each bath is intended to receive more than half-a-dozen plates I would use a little more albumen, in order to make up for its rapid removal by the plates.

M. Carey Lea.

THE COMPARATIVE STRENGTH OF AFFINITY OF IODINE, BROMINE, AND CHLORINE FOR SILVER.

The present article is the forerunner of another, which I hope to publish shortly, on the comparative *sensitiveness* of iodide, bromide, and chloride of silver when fairly submitted to the same treatment in the various processes of photography; but, as the explanation of the results there to be stated appears to depend on the comparative strength of *affinity* of the three halogens, iodine, bromine, and chlorine, for silver, I have preferred to treat that subject in this short and separate article, in which I shall endeavour to show that iodine has a greater affinity for silver than either bromine or chlorine has; and that bromine has a greater affinity for silver than chlorine has.

The following are the reasons which have led me to the above conclusion, and if any one of my readers can raise valid objections to them I earnestly beg of him to do so, because I am going to base upon the conclusion, if sound, what appears to be a reasonable and obvious explanation of some of the principal phenomena in our art-science. We are all anxious to arrive at the truth, and no one more so than myself. I hope I shall be believed when I say most emphatically that I have no pet theories and no desire to warp facts in order to support them.

If we put into separate vessels some thoroughly well-washed bromide and chloride of silver—either recently prepared or not—and add to each some tincture of iodine, and then again well wash the salt, we shall find that both the pale yellow bromide of silver and also the white chloride of silver have changed colour, and taken the deep yellow tint of iodide of silver. In a word: the iodine has displaced the bromine and the chlorine from the bromide and the chloride of silver, owing to its greater affinity for silver.

Next: if we treat some well-washed chloride of silver—either recently prepared or not—with an aqueous solution of bromine, and then wash the salt, we shall find that the white chloride of silver has taken the pale yellow colour of bromide of silver, the bromine having displaced the chlorine from the chloride of silver.

Some of my chemical readers will, I hope, repeat these experiments, and either confirm or disprove them. If true, the conclusion which I have drawn from them seems reasonable enough.

But here are some more experiments which seem to lead independently to the same conclusion:—Take some plain collodion and iodise it with five grains of iodide of cadmium per ounce. Put also an equal quantity of the same plain collodion into two separate bottles, and add to them respectively equivalent quantities of bromide and chloride of cadmium. Now coat three plates with these iodised, bromised, and chlorised collodions respectively, and note the time which each plate will require to give a perfect film of iodide, bromide, or chloride of silver in a forty-grain nitrate bath. At this season the iodised collodion will require about three minutes, the bromised collodion about half-an-hour, and the chlorised collodion about twenty-four hours.

The above results can, I think, only be due to the superior affinity of iodine for silver over both bromine and chlorine, and to the superior affinity of bromine for silver over chlorine.

Now, if this be true, we see, in the first place, why the addition of a little bromide to iodised collodion tends to give bright negatives; for it is evident that, after a short immersion in the nitrate bath, there will always remain in the film a little unconverted soluble bromide, which will tend to prevent the formation of that mischievous double salt, iodo-nitrate of silver, which produces fog under the action of the developer.

And, in the second place, we see why the addition of a soluble chloride to a collodio-bromide emulsion, containing excess of silver, tends to give bright negatives; because the chloride of silver is so slowly formed within the viscid emulsion that when the film is washed there will always remain in it a little unconverted soluble chloride in excess. Everyone knows that it is exceedingly difficult to remove unconverted soluble chloride or bromide from a collodion film, but exceedingly easy to remove an excess of free nitrate. All appreciable trace of the latter can in five minutes be washed out of a film which has even been excited in an eighty-grain nitrate bath; but you cannot wash all appreciable trace of a soluble chloride or bromide out of a film in twenty-four hours, even with several changes of water. I have often heard it said that no amount of rain and storm will entirely wash chloride of zinc out of sails which have been steeped in it. My own belief, at this moment, is that no film, whether of iodide, bromide, or chloride of silver, will give a bright negative unless some unconverted soluble haloid salt remains in it; and that no good-working emulsion film is really free from this, or really contains an excess of silver nitrate.

But these two preceding paragraphs are a digression, and are merely introduced as an application of the argument.

In my next article I hope to prove that bromide of silver is *less* sensitive to light in the presence of free nitrate of silver than in the presence of alkaline organic matter, or even of pure water.

Thomas Sutton, B.A.

EMULSION PLATES WITHOUT WASHING.

You end your interesting article of last week with the following words:—

"From these experiments we are quite certain that the omission of the washing previous to immersion in the preservative is a great advantage, both as regards sensitiveness and brilliancy. Why it should be so, or why previous experimentalists have not succeeded with it, we are not in a position to say."

May I bring to your notice the fact that Canon Beechey—a sound and reliable worker—has published several times in your columns his strong recommendation to dry-plate workers to omit the washing and put the plate direct into the preservative? From your number of August 2nd I quote the following sentences from a letter of Canon Beechey's:—

"I am quite certain that Wortley plates containing large excess of silver may be put direct into a strong preservative of pyro. and ale without any washing, and be all the more sensitive and easily intensified. * * * * With this *exposé* of my ideas I will only repeat the fact that I can put a plate coated with Colonel Wortley's own emulsion, or one of my own making, with an excess of ten grains of silver to the ounce and a drop of nitric acid direct, and without any washing, into a strong pyro. preservative, and leave it there for two minutes, and the resulting plate I believe to be more rapid and intense than when it is previously washed."

From my correspondence I find that many workers have followed Canon Beechey's lead, and that direct immersion with the preservative is a method frequently adopted, and with great success. We owe Canon Beechey our best thanks for first publishing the proposal in your columns.

I have thought it right to call your attention to this, as many friends have seen me during the past two years work in this manner and make many experiments on the subject, and as it has now attracted a leading article from yourselves I desire that Canon Beechey should have the honour due to him.

I am pleased to notice that you place my salicine preservative at the head of all those you tried. It is certainly a good one, and in a series of very exhaustive experiments on every known, and many unknown, preservatives I was unable to find one superior to it.

I see Mr. M. Carey Lea, who is, *longo intervallo*, following in Canon Beechey's very footsteps, has taken Mr. Sutton's favourite idea of an albumen preservative; but the one you recommended last week is far superior to it. Till it is tried no one can properly appreciate the value of salicine.

H. Stuart Wortley.

ON MAKING COLLODION FOR WET OR DRY-PLATE WORK.

I find that amongst a host of my photographic acquaintances few attempt to make their own collodion, and many are afraid of even modifying the nature of it when the remedy is pointed out.

Most of the manufactured collodion supplied to photographers is iodised, so that a few minutes only is supposed to elapse between collodionising the plate and the developing of it into a negative. Generally not more than one grain of bromide to the ounce and four or five of iodide will be found as the proportions used in the manufacture of the collodion. As an iodide salt has a greedy affinity for silver the plate is quickly coated with iodide of silver, and as soon deteriorates in its working properties—the free silver crystallising on the face of the plate, and with an excessive exposure on some parts (the high lights) the action spreads beyond its legitimate boundary, and results in what is known as solarisation; whilst the more imperfectly-illuminated portions of the picture suffer in an opposite direction, having a weak susceptibility to such light as is formed by the lower rays of the spectrum.

Bromide in a collodion tends to bring out the weak rays, but is as equally limited as an iodide so far as the range of its capabilities is concerned. The high lights suffer to such an extent that they are not vigorously impressed, so that the resulting negative is short of pluck.

I commenced to manufacture my own collodion many years ago, yet I find that every year I am compelled to trim down my notions on this subject. Although one may read a very unreliable statement in a journal, he may yet be impressed by it, and store it away amongst the treasures of his memory for future experiment or application.

Collodion for special purposes differs almost as much as do lenses in their varied construction. Neither the one nor the other can be made for universal application. I have recently tested collodion made from methylated spirit against the same article made with a solvent of pure spirit, and the result is decidedly in favour of the latter. Mr. Sutton, I remember, a few years ago advocated the use of methylated spirit as being equal to the pure spirit, if it were redrawn over lime and filtered through animal charcoal. This has been my general mode of procedure, and I have always satisfied myself with the production of the collodion resulting from it. I have also sometimes bought "purified methylated alcohol," which, up to a year or two ago, chemists were allowed to sell; but, as the excise authorities now disallow any re-distillation, there is no choice between the very best and pure spirit and that which is methylated, having a tenth portion of naphtha intermixed with, or a certain proportion of a gum dissolved in, it. That containing gum is known as "finish," for which no use can be found in photography, and which becomes cloudy when mixed with water—a very easy test to apply when the nature of the article in question is in any way doubtful.

But, as the naphtha is inseparable from the alcohol by distillation, the reason why such a manifest improvement is apparent is, doubtless, owing to the absence of the fusel oil which unsparingly enter into the spirit. If an iodiser be made up of methylated spirit it remains colourless. Even when tincture of iodine is added the colour which it imparts is not permanent until it be renewed half-a-dozen times at the least. This is the first apparent change in our effort to manufacture collodion out of impure solvents. But, if the same alcohol be re-distilled over lime and filtered through charcoal, the iodiser made from it retains that pale orange tint which we are accustomed to see in commercial samples. The distillation here works an apparent change, which is also a palpable improvement as far as its working properties are concerned. Amateurs who do not vend their wares are mostly anxious to cut down all extraneous expense; and to one who dabbles in the "new processes" methylated alcohol is considered quite good enough to throw down the sink. As most likely the Excise would not be excessively lenient to anyone doing a little illicit distillation, it taxes one's ingenuity to separate the undesirable fusel oil from the liquid in question, *i.e.*, combining the photographic and financial view that can be taken of it.

About four years ago The British Journal of Photography delighted its readers with the announcement that methyl in alcohol could be deodorised by distillation over soap. I was soon as active in my inquiries for "hard soda soap" as any excise officer would be for an illicit distiller; but I found that the vendors of the oleaginous substance were but little acquainted with it, beyond the price per pound at which it was retailed. Castile soap was accepted as the correct thing, or the nearest to it as far as I could make out. After cutting up the quantity set forth as necessary (with probably a good deal in excess) my still was primed with the mixture of the soap and methylated spirit, and the whole fixed in a water bath. When the clandestine occupation commenced, and I saw the tears trickling away from the condensing pipe, I smelled and tasted, and became convinced of the "bigness" of the discovery. I made collodion for wet plates and collodion for emulsions, and found they were all that could be wished for. I felt delighted, and laid my still aside for future excise frauds.

A year afterwards I again prepared for another cheap supply of pure spirit by fixing up the apparatus on the kitchen fire—I patiently waiting. The still showed signs of inward emotion, and was doubtless boiling; but evidently the condensing pipe refused to participate in the fraud, as an embargo was placed on the passage for the spirit. I cleared the kitchen of the scions of our household and hesitated whether to rake out the fire or take off the cap of the supply pipe. The latter plan I decided upon, and which I carried out with a pair of gas pliers, but which said articles (pliers and cap) were carried some distance up the chimney. On dissecting the gear of the still I found the worm was choked with soap—"hard soda soap"—for it taxed my patience to remove it. Any one not caring for the trouble involved in preparing pure spirit from methylated spirit, and despising the slight risks connected with it, can proceed by laying in a supply of Castile soap and afterwards retailing the collodion at half-a-crown a pound.

I have been on various tacks to discover a "legitimate" way of taking methyl out of alcohol. I have partially succeeded, and without distillation of any kind. Having, say, a quart bottleful, I add an ounce of powdered animal charcoal, and shake it well up. It will take two or three days to totally subside, if that were requisite; but I teem the whole into a bladder closely tied at the neck, and allow it to hang for a week in a warm place. By this means the water percolates through the skin of the bladder, which is totally impervious to spirit; consequently the spirit loses the water and gains in strength approaching nearly to absolute. Besides, the charcoal has an affinity both for the methyl and the fusel oil, and consequently abstracts (in a degree) the whole of the objectionable properties likely to be found in the liquid before it is thus doctored.

I am now working a little differently, by adding permanganate of potash with a trace of nitrate of silver, after teeming it from the bladder, allowing it to stand in the sun for a while, hoping that thereby the whole of the fusel oil will be abstracted—even as much so as in the case of distillation over lime and filtration through charcoal. So thus a solvent for collodion may be found easy to prepare, cheap when prepared, and, above all, of excellent quality when brought to the test. Twopence invested in a bladder purchases the whole of the chemical appliances required to carry out this scientific experiment, and neither the fear of explosions nor the terror of excise officers will be likely to disturb the quietude of the nervous or over-conscientious photographer.

But as threepence an ounce will pay for pure alcohol, and the expense is distributed over the number of negatives that two ounces of collodion are capable of producing, the question arises—Is the abstracting of methyl from alcohol worth much consideration at all? "Yes" or "No" will not annul the value of knowing how to do it, and the inquiry is not very laborious, nor does it demand much chemical skill. I consider methylated ether quite good enough for collodion; for if fusel oil be the element to war against it is assuredly put *hors de combat* before it reaches the hands of the photographic experimentalist or collodion manufacturer.

So much for the solvents of collodion. Now for the pyroxyline. When I wrote on the intensity of collodion, some few months back, I then pointed out that nitro-glucose was the active ingredient in producing it, and expressed my intention of adding it to my bromised collodion for emulsion purposes. A month or two afterwards Mr. Duchochois read a paper before the Philadelphia Photographic Society giving his formula for instantaneous collodion, and explaining that the pyroxyline should be steeped in alcohol to dissolve out the nitro-glucose. This is but a modification of Mr. Gage's plan of boiling it for some time, and drying it again, before dissolving. It is tantamount to the same thing, produced at a lower temperature. The collodion made from it is quick, and appears of fine structure, whilst high-temperature cotton is slower, and shows a coarser structure. For microscopic photography boiling the cotton, or steeping it in alcohol, is a step in the right direction.

Mr. W. B. Bolton is now adding organic matter, in the shape of nitro-glucose, to his bromised pellicle, but does not say what the home-made article is that he adds to the emulsion.

When I was working the collodio-bromide process with Mr. T. Sebastian Davis's preservative for his "tourist's collodio-albumen process" I added a drop or two of syrupy extract of raisin to my emulsion, thinking that the nitro-glucose would confer sensitiveness and density; but, as the emulsion was kept rather too long before use, I was not aware whether the thickening of the emulsion was due to the keeping or to the extract of raisin. I generally condemn an emulsion that is creamy when teemed on a plate. The instructions and advice of many recommend this as an essential for obtaining good negatives; but I like a very thin emulsion, so that the negative impression cannot be buried in the film. I also prefer the same thing for the wet process, although it is against intensity. Captain Abney recommends adding water to the collodion for dry-plate work. Some years ago this same thing was practised by many dry-plate workers, and, as far as my recollection serves me, the collodion which had five or six drops of distilled water in it was more easily penetrated by aqueous solution. The bath did not require to be so strong to convert a strongly-bromised collodionised plate, or, what is the same thing, could be more quickly transferred from the bath; was sooner washed free of ether, alcohol, and free silver; and the preservative easily penetrated the film. The development was more satisfactory in every respect.

Workers using Mr. Sutton's bromised collodion and the eighty-grain bath will do well to bear this in mind. A sixty-grain bath will be ample for this collodion if water be added until crapiness begins to appear, when a drachm to the ounce of the normal collodion will make matters safe for good negatives. Dry-plate workers should also use the bath in a flat dish, if the collodion require a long immersion, as an accumulation of ether and alcohol is antagonistic to a rapid conversion into bromide of silver, and the flat bath has such an exposed surface for its escape that what little may remain has no depth of water to enchain it there. Bear in mind to add water to the collodion and the flat bath when you next make dry plates.

It is doubtful whether gelatine will ever be substituted for collodion; for even that substance cannot be impressed to give sufficient density for a negative unless some organic substance be added to the pure gelatine when preparing the emulsion. I have now on hand a string of experiments in this process, and I hope to be able to work it quite up the degree of sensitiveness to that of collodion; but the film allows of such slow evaporation that the general portrait business cannot, I fear, be ever worked successfully by it. Anyone experimenting in this process should try the nitro-glucose, the raisin extract (washed raisins torn open), hot water added, letting it simmer until it becomes syrupy. J. W. Gough.

EXCESS OF SILVER IN EMULSIONS.

I accord with great pleasure the credit which Colonel Stuart Wortley merits for having so thoroughly brought out the advantages of a great excess of nitrate of silver for highly-sensitive dry plates.

Whatever may be the cause of the phenomenon, it is certain that an emulsion prepared with a very large excess of nitrate acts very differently, treat it subsequently as we may, from one made with a mere excess. I do not believe that any living man has begun to solve the mystery of emulsions, whether of gelatine or collodion; and, despite all the discouragements of those years of indefatigable experimenting, I still retain my faith that they will one day do all that is required of photography.

I have not as yet succeeded entirely in reconciling the highest sensitiveness I have obtained with the qualities I consider of much greater importance, and Colonel Wortley has so well explored the field in the direction of high sensitiveness that I have never attempted to compete with him in that direction. I have differed from him on many points, and may yet do so on others; but in this I cordially admit that he was right, and that the more nitrate of silver we can get into solution the better for the sensitiveness of our emulsion. I have often put in all I could make it carry, and two years ago was in the habit of using twenty-five grains per ounce. I do not now use so much, but I apply it in a different manner. W. J. Stillman.

THOUGHTS ON LIGHTING "REMBRANDT" PICTURES.

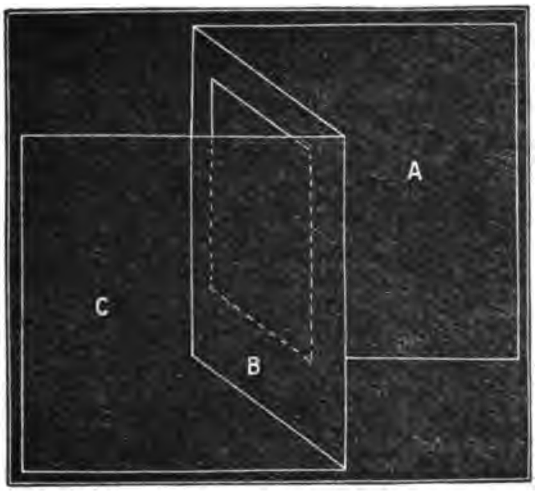
The introduction of the so-called "Rembrandt" pictures will in the future be marked as a period when the harness of conventional lighting was thrown aside, and a general study of style was commenced in which the lights and shades are in direct opposition to what has hitherto been recognised as the correct thing, viz., that while in the past the lights have had the predominance, in the new (if it may now be termed "new") the lights are few and sparkling, and the shadows in broad, but withal delicate, masses.

The influence this will have on the photographer of the future will undoubtedly be that of increased art-culture, from the greater discrimination of the varied effects of light and shade which will be required; but the influence it has on the photographer of the present period is the cultivation of a taste (that fortunately will be suicidal) of an *indiscriminate* use of the lead pencil. The disease of photography is now plumbago on the brain. So much for the merits or demerits of retouching.

Below will be found a description of what may be termed a screen, to enable one more readily to obtain the desired effect of light and shade in the pictures now under discussion. The screen, of which a diagram is subjoined in our next page, was seen by the writer in the studio of a photographer whose works are well known for their artistic qualities.

A is the background, which, in this case, was of a dark colour—rather too dark for my taste; B is hinged to A, and contains an oblong aperture through which light is admitted to the sitter; C is hinged to B and shades the lens. The whole runs on castors and can be moved to any part of the studio to obtain the desired effect of light, or can be folded together and stowed away in a corner. With the exception of the background the whole of the framework was covered with a grey material of a colour approaching a warm French grey, and in the hands of a skilful man will be found to supersede many of the loose screens generally used.

Any photographer, however, who may expect that he will ever light a head successfully by a particular screen or a given rule of lighting will fall into a grievous error, unless he first make all faces



alike, and then one photograph will suit the whole of mankind. The object of any description of a system of lighting is to remove as far as possible the difficulties that may be termed "mechanical." An artist would make a picture in the face of difficulties; but it is better and quite possible to reduce these to the minimum, and so leave him to use his abilities in a more legitimate manner.

The day has not quite left us when the first inquiry the sight of a beautiful picture elicits, is either "What lens?" "Whose collodion?" "What developer?" &c., or something of the kind. Depend upon it, good pictures are contained in none of these, although they may be necessary to their production. Many who purchased a system of lighting, wherein a model was artistically illuminated, failed to see that it did not rest so much in what particular shutters were opened or closed, but upon the skill and taste of the man who could so light his model with those shutters. The system was never intended to apply to all faces alike, but to show a means of so controlling the light as to get any desired effect. The vendor gave the means, but could not provide the material enabling his customer to see the end in view.

Still, after all, we march on. The time has long gone by when pictures, posed with hands on thighs, thumbs outside, arms a-kimbo, and eyes right, were the rule. Artistic posing is becoming common, and we appear to have entered upon a new field, and to be concentrating attention upon artistic lighting. That we shall be as successful in this department as we have been in others there is no doubt; and, in the future, it is to be hoped that the sameness of our productions will no longer exist—each of them having an individuality of its own, &c., and being a perfect representation of the taste and feeling of the man who could so skilfully light it as to make it stand alone from its fellows. He who does this will never find a dearth of patrons.

W. E. BATHO.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.

OUR Editors must certainly have been indulging in a Homeric nod of late, otherwise how could they have permitted Mr. Sutton and others to write and publish so much on the assumption that collodion is sold by the pound and not by the pint? Permit me to say, after a great deal of time spent in poring over price lists, catalogues, and advertisements, that collodion is not sold in this country by the *pound*, but by the *pint*. The only exception I can find, very curiously, is that of Sutton's collodion, which is advertised as sold at per "twenty ounces"—whether by weight or measure is not stated. This matter reminds me of the anecdote of King James (Sixth of Scotland and First of England) and the philosophers of his day. "How does it happen," asked the monarch, addressing the *savants*, "that when I have two vessels of water equipoised in a balance, if I put a live fish in one the equilibrium of the balance is not affected?" Many plausible theories were at once propounded to account for this, until a shrewd Scotchman present ventured to deny the fact as alleged by the King, who laughingly said that the latter view was the correct one. So in this case—collodion is *not* sold by the pound.

I imagine that Mr. M. Carey Lea does not give us in this country sufficient credit for the ability of putting the right saddle on the right horse in respect of photographic invention and discovery. For the benefit of any who, as he does, imagine that the late Rev. J. B. Reade, F.R.S., received but a scanty share of the honour which is due to him in connection with photography, I beg to say that the name and fame of Mr. Reade are very warmly remembered in England. We all know how much he did, and the very practical nature of his discoveries; and there are many—the present writer among them—who will never forget the kind, genial, and self-abnegatory way in which Mr. Reade communicated, or afterwards referred to, inventions and discoveries of real value which had been made by him. The time, however, will come when the merely pretentious will be separated from the real, and when by the removal of worthless weeds the plants will be seen in all their beauty. May I here say that, when recourse shall be had to such a winnowing process, the name of Mr. Lea himself will be found not *very* far apart from that of Mr. Reade.

The influence which Dr. Vogel asserted is produced by colouring matters on the reduction of silver salts is now finally disposed of. Messrs. M. Carey Lea, Spiller, and others have given the final *coup de grace* to this notion of Dr. Vogel's, and his fine theory of a prolongation of the action of the more refrangible rays of the spectrum must henceforth be relegated to the limbo of photographic abortions.

The "powder process" has been having a "red-letter" time of it of late. Herr Obernetter deserves thanks for the effective manner in which he has proved to the public that by a long-known process—which, however, was not directed to this special end—negatives may be reproduced with a marvellous amount of fidelity, the loss of detail being really very slight.

If any reader desire to obtain an exceedingly-fine opalotype let him try the process I am now about to indicate, and I predict that he will never during his photographic life have anything to do either with collodio-chloride or any other kind of printing. Use polished and flashed opal, and give it a preliminary coating of diluted alcohol. Now coat it with a rather old and red sample of collodion; excite in an acid bath, wash, coat with a ten-grain solution of tannin, and dry. Expose under a negative for one minute, at a distance of eight inches from the flame of an argand, paraffine, or strong moderator lamp, there being no ground glass globe interposed between the flame and the negative at the time of exposure. Avoid alkaline development, but proceed as follows:—Mix up a solution of pyrogallic and citric acids in the proportion of three grains of the former and two of the latter to two ounces of water; and to enough of this to flow over the plate add two or three drops of a twenty-grain solution of silver. Previous to applying this wet the surface of the opal glass with water, and then pour on the developer, taking care that the light by which development is conducted be well protected by orange glass. The picture will develope evenly and with a fair degree of rapidity, yet not so as to prove in the least unmanageable. When it looks well as a positive wash it, and fix with cyanide. Now place it in an extremely-weak acetate toning bath, and watch it very carefully until the tone is nearly as dark as it is required to be. Then wash thoroughly and dry. A slightly-different class of tone is obtained by the use of a sulphocyanide toning bath; but so far as my trials have gone I know of nothing to surpass the weak acetate toning bath. This yields very beautiful and permanent pictures, the whites being pure, the blacks deep, and the intermediate tones quite perfect. I have obtained good opalotypes by salting with a chloride the vehicle, whether albumen or collodion, and then sensitising the plate in a bath, drying and printing direct in a printing-frame, as described by Mr. Ross nearly twenty years ago; but, notwithstanding a good deal of experience with this, I find that the balance of advantages lies with the developed plate, and hence of the two methods I rather incline to the latter.

Success to Mr. Weston's hot burnisher! But will Mr. Joseph B. Bass, or anyone else, kindly inform me if I infringe the patent obtained for this piece of apparatus by passing a hot, polished, laundress's iron over the face of a mounted photograph? I used to do so very often in days of yore, having in so doing adopted the recommendation of some Mentor whose name I cannot recal at the present moment, and to this practice I have occasionally adhered ever since. Now, as I don't wish to do anything illegal, I am desirous of having as soon as possible an answer to the question I have just put. Should Mr. Bass allow me to continue this practice, would he further say if I may press heavily on the heel of the iron, which is rather rounded and very smooth, so as to make it, rather than the flat bottom of the iron, the part which comes into contact with the face of the print? Having seen the Weston burnisher in operation I am bound to confess that it acts very excellently and produces a beautiful, highly-glazed surface.

I rather regret, on the whole, to learn that the series of international exhibitions—of which a programme was issued extending over several years, and which in a year or two would have included photography and photographic apparatus as a speciality of a certain season—are about to pay "the debt of nature," and that this year's exhibition is *le chant du cygne*. Quite apart from photography, pictorial and industrial art was well represented, and the place exercised a practical, educational influence over the country. All things, however, must come to an end; but that the series of international exhibitions should have come to such an *untimely* end is a matter for sincere regret.

I am a dead man! Of that there can be no doubt. Your good foreign (or Chester) correspondent says that when applying cyanide to the hands to remove a stain "there is nothing between you and *instant death* but a cuticle no thicker than paper, which may or may not be abraded." Well, here is my case:—One evening, about three weeks ago, I was working with a deep basin containing about a quart of somewhat strong cyanide solution, and by one of those accidents which *will* happen to the most careful of persons, a portion of the skin of my hand became abraded to such an extent as to cause bleeding. A favourite knife fell into the solution, and, without pausing to reflect, I dashed my wounded hand in and fished it up. Well, now, what about the "instant-death" idea? As Paddy would say—"Was I kilt intirely, or was I not?" If Mr. Sutton's doctrine be correct, I must then and there have given up the ghost, and consequently the "notes" I now indite are entitled to rank as "a spirit communication." This, I think, is logical, and even Mr. Sutton will chalk it up as one for those who believe in those abnormal visitations of which we hear so much, and about which I shall speak at greater length in a separate paragraph.

(To be concluded in our next.)

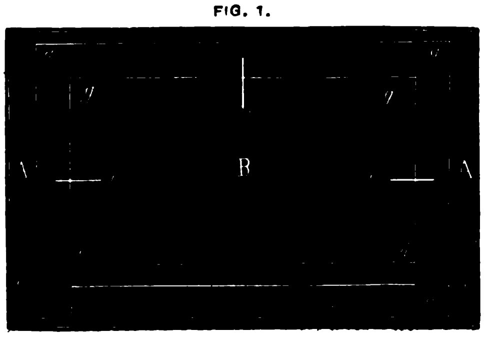
SUBSTITUTE FOR A DARK SLIDE.

M. A. de Pokorsky-Joracko—whose name the *Moniteur* and ourselves either then or now misspel, but who is after some fashion lately familiar to our readers—has communicated to the French photographic world a new apparatus for field work, which seems to be ingenious and portable. It is adapted, says its author, for taking negatives on paper or dry plates, and has nothing in common with any of those inventions hitherto used. It gives facility for the photographer to change his plates for the field and for working whenever he may be forced too far from his studio.

All apparatus of this kind hitherto proposed have been very complicated, and have had for their object the transferrence of the exposed papers or plates to a box or cloth receptacle and the substitution of fresh ones. A list of the apparatus given shows that M. Joracko's knowledge is not so universal as his assertion; for the only inventions he specifies are French, and we need not enumerate them here. They all bear, in some form or other, the characteristic described by him.

The "cassette" or dark slide which M. Joracko has called "Russian" contains only one sheet of prepared paper or sensitised glass, and is placed in the receptacle in the dark chamber, and withdrawn therefrom with that paper or glass. It is so simple that any photographer can make it for himself, and is light, consisting only of two leaves of cardboard, easy to pack—six of them occupying less than two inches space—and of a very insignificant price, while adaptable, without alteration, to any sort of dark chamber.

FIG. 1.



This is how it is made:—A piece of solid cardboard (*fig.* , AA) is cut according to the size of the interior of the camera or of the dark slide. On the edge of this cardboard four pieces of the same cardboard is glued (*a a a*), and in the midst of these bands, which form a frame, is introduced a piece of cardboard (B), which serves as a lid, and comes down as far as the line *e e*. At the lower end it is glued to the nether board with a hinge (*d d*) formed of some tough substance, such as taffeta or deerskin.

FIG. 2.

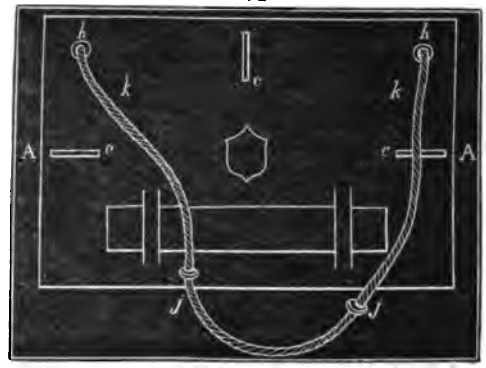
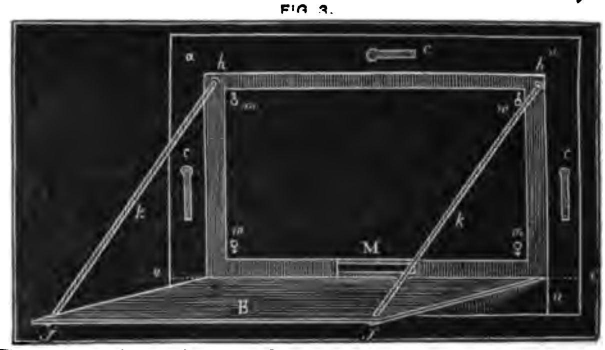


Fig. 2 presents the reverse side of this portfolio, which is formed by the larger sheet of cardboard. In this sheet, at the upper corners, two holes are bored (*h h*), through which the cord *k* is passed, having two knots at its two ends, and two plugs near the middle, made (say) of velvet. The knots fasten the cord to the lid of the portfolio, and the length should be determined by the space required to allow that lid to fall down flat. When so down the pads or plugs *j j* should come against the holes. They should, in fact, hold the lid parallel to the bottom of the camera, but not allow it to rest thereon. Round the edge of the lid little strips of iron wire should be placed (*c c c*, *fig.* 1), doubled U-shape, and passed through so that one limb of the U is at the back.

FIG. 3.



Turning to *fig.* 3, the portfolio will be seen with the lid open. To do this, after having placed it firmly in the opening of the dark chamber, it is only necessary to turn the wire catches, and a spring—a bit of a watch spring will do, placed either above or below, and bent towards the lid as at M—will push it open, and cause it to open downwards, dragging the cords with it, till the plugs check the fall. The sensitised paper attached by pins to the upright is thus exposed to the action of the light; and, of course, everything must be arranged so that the surface of the sheet is exactly where the ground glass was. In order to make this apparatus do for glass it is necessary to thicken the bands *a a a*, *fig.* 1, according to the thickness of the glass, and to fasten the glass in with large pins (*m m*, *fig.* 3). In a dark room or at night the papers or glasses can be changed; but otherwise by this means one carries out for the day's work a portfolio with each plate, and keeps it there till it is brought back.

Such is M. de Pokorsky-Joracko's plan, and it certainly has in one sense the recommendation of simplicity; but it appears to us that it will, at least with glass, be difficult to get that exactness of fit which will ensure the sensitive surface being exactly in the same place always as the ground glass. With paper always practically of one thickness that may indeed be possible, but not so with glass, each plate of which varies slightly in many ways. The fitting, too, would have to be extremely neat in other respects, otherwise, in the absence of the ordinary dark slide, light would be very apt to get in somewhere, and with glasses, at anyrate, the use of the slide and this cardboard "cassette" as well would be impossible. But for the hints that it gives for possibly better things we commend the idea to our readers

Our Editorial Table.

ILLUSTRATIONS OF CHINA AND ITS PEOPLE.

By J. THOMSON, F.R.G.S.

London: SAMPSON LOW, MARSTON, LOW, AND SEARL.

MR. THOMSON has now completed his great work, which, as stated on the title-page, consists of two hundred photographs, with letterpress descriptive of the places and people represented.

We have in this magnificent work a great deal of excellent, sound information, conveyed in a pleasant and unconstrained manner, concerning the government, the ministers of state, and the inner life of the inhabitants of the Celestial Empire. The fact that no satisfactory and exhaustive description of the domestic architecture and manners of the Chinese has ever before been published is accounted for by the ignorance prevailing on the subject, owing to the vastness of the country, the wide divergences of constructive styles, and the strong dislike entertained by the people to admitting strangers into the "inner courts" of their dwellings, for these they hold to be sacred and inviolable. To such an extent has this idea of privacy and family isolation been carried that Chinese homes have for ages been constructed, on all occasions, after a model which seems to aim at perfect family seclusion from friends, and even relatives, no less than from strangers. Notwithstanding this strict seclusion Mr. Thomson has contrived to give us an insight into the private family sanctuaries of a mandarin's house, and not only into the outer courts, but even into the interior portions of his dwelling. We are thus permitted to make acquaintance with a Celestial family in its entirety, and to gaze at our leisure upon each separate member of the domestic circle, including even "baby." From a momentary glance at a domestic scene thus placed before the eye pictorially we realise more of the complete inner life of the groups depicted than would otherwise be the case were the student of men and manners to peruse pages of merely verbal description; hence the immense value of photography in consequence of its simple truthfulness.

Considerable attention has been displayed in having excellent representative examples of Chinese female *coiffure*, each of which would be a study for English ladies. We are introduced to the principal street, and also the chief architectural features, in the City of Pekin, care evidently having been taken to select for photographic delineation such objects and subjects as represent manners and customs as well as those which are merely archæological and topographical. Whether the subject be the story-teller, the ballad-singer, the exhibitor of the puppet- or peep-show, or the itinerant chiropodist—all seem natural, easy, and not posed for the occasion. As to whether such groups as we have indicated were really posed in the public streets or were instantaneously taken without the knowledge of the respective subjects we are not aware; there is nothing, however, in the pictures to indicate this, which is, perhaps, the highest praise that can be bestowed upon such photographic delineations.

The pictures, as previously stated, have been printed by Messrs. Spencer, Sawyer, Bird and Co., by their mechanical autotype process. As examples of exceptionally good printing we may cite the *Bronze Temple* at Wan-Show-Shan—a structure of solid bronze, which stands in the grounds of the Imperial Summer Palace. This picture, which is taken against the sun, is a very fine example of perfect photographic detail. The same may be said of the *Group of Stone Animals* forming an avenue leading to the tombs of the Ming emperors of China. These animals are sculptured in white limestone.

We close our notice of the completed work by an extract from a recent number of the *Saturday Review*—a paragraph which tersely sums up the merits of these important and sumptuous volumes:—

"At the Nankow Pass in the Great Wall Mr. Thomson takes leave of his readers. And thus in the four volumes of which his work consists he has illustrated China and its people throughout the length and breadth of the land. He has placed before the English public accurate reflections of all the principal objects of interest which are to be met with from Hong-Kong to the Great Wall, and from Shanghai to the western portions of the empire. As works of art the photographs are excellent, and the letterpress which accompanies them is as full of information as it is concise and to the point. The entire work is worthy of all praise, both on account of the style in which it is executed, and of the discrimination, industry, and tact employed in its compilation."

We submit for the author's consideration whether it would not be advisable to re-issue the work in a much smaller and less expensive form, so as to bring it within the means of a larger number of the reading public. We think such an edition very desirable.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 9	London	9, Conduit-street, Regent-street.
" 11	South London	John-street, Adelphi.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary meeting of this Association was held on Tuesday evening, the 26th ult., at No. 15, Oldhall-street,—the Rev. H. J. Palmer in the chair.

The minutes of the previous meeting were read and passed.

In reference to the spoiling by the spirit varnish of some negatives taken by Mr. Bolton's process,

Mr. W. KEITH said that a second negative need never be lost from that cause, as, whenever it was found that the varnish attacked the film, or the plate happened to be dirty, it was only necessary to give the negative a coating of thin gum solution.

Mr. W. ATKINS said that he had used gum and also albumen with good effect.

Mr. Keith then minutely described the capabilities and construction of Ross's new symmetrical lenses, and Mr. Atkins handed round a pair of No. 3 for inspection. The lightness and portability of the lenses, and the fact that one flange (of about an inch and a-half aperture) was sufficient for the whole series was considered to be great inducements to their adopion by all field photographers, especially as by merely changing the stop different angles of view could be obtained.

Votes of thanks were passed to Mr. Keith for his interesting information, and to Mr. Atkins for his kindness in providing a room to hold the meeting, the usual meeting room at the Free Library being closed for cleaning.

A discussion took place as to the desirability of obtaining a meeting room where conveniences for experiments in developing and other illustrations in the working details of photography could be readily exhibited. The Secretary was requested to make inquiries and report to the next meeting.

An excursion to Rhydymwyn, near Mold, was fixed for Wednesday, the 10th instant.

The meeting was shortly afterwards adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

AT the second March meeting Dr. Vogel was in the chair, and, after the new members had been admitted, presented a *brochure*, by Herr Carl Schwier, of Weimer, called *Tables for the Dark Room*, consisting of a tabulated collection of the various negative processes, their formulæ, peculiarities, sources of failure, &c., bringing under the eye all that was needful for dark-room guidance.

A number of other minor matters, on subjects such as Herr Obernetter's process and Dr. Vogel's spectrum researches, with which we have already dealt, having been disposed of, several question-box subjects came up for discussion. The first of these was—"How can we best get the silver out of a cyanide fixing bath?"

Herr KOCH recommended metallic precipitation by means of slips of copper or copper filings; with the help of hydrochloric acid this was certain to throw it down.

Another question was—"How does it happen that the first plate sensitised in a restored bath frequently gives numerous parallel streaks, and that after a time these disappear?"

Herr PRÜMM was of opinion that it might be due to strongly-iodised collodion, and they were then visible before development. In such a case he recommended silvering in a tray with the film side up, the diluting of the developer one-half, and the pouring of it off on the under side of the plate. By that means he had avoided the failures.

Herr BIEQUER thought the weakening of the developer enough for the purpose.

On the question—"What is the best collodion in the market?"

The CHAIRMAN said there were so many good that comparisons would be invidious. Even the practical proofs applied to test collodion would not always enable one to say what was the best; in different hands at different times the same collodion gave such varying results.

Herr PRÜMM asked if the members present employed the same collodion when copying pictures as at other times.

One answered in the affirmative, and another said that, for engravings at anyrate, a hard collodion should be used.

The CHAIRMAN said he preferred a sensitive collodion for such works. It was an error to suppose that a hard collodion was better adapted for such purposes. Hard collodion gave, to be sure, a strong deposit on the white. The white ground colour visible under the shadows of a drawing was, however, so weakened by blending, in reproducing in the camera, that it gave no other result than a black coat in a brilliant portrait would give. Hence the collodion that would suit the latter kind of object would suit the former.

The SECRETARY said that a hard collodion and one that gave a thick, dense image ought not to be confounded.

The CHAIRMAN said that for landscapes he used a thinner and less sensitive collodion, which gave the clouds better. Moreover, it was a singular thing that many collodions which, when briefly exposed, appear little sensitive give with longer exposure just as detailed an image as another more sensitive collodion gives in the same time. He had obtained two collodions, one of which gave a much more detailed image in ten seconds than the other, while both, when exposed thirty seconds, gave results alike.

Herr PRÜMM had the same experience, and he generally gave a long exposure with portraits, which were not easy to over-expose.

Herr REICHARD, on the other hand, thought that exposure should be very carefully regulated, and considered that the least over-exposure gave bad pictures.

It was, however, pointed out that these speakers differed probably of necessity; for Herr Prümm worked with much less light than his *confrère*, and so it might well be that a few seconds one way or other would make no perceptible difference in his case, although ruinous to the other.

On it being remarked that high sensitiveness in collodion was a very great desideratum, and that a large dose of bromide was the way to get it,

The CHAIRMAN said that that was not a good recipe, but a bad one. He had made experiments with collodions containing various degrees of bromide—from nine parts of iodide of cadmium and one part of bromide to equal parts of the two salts, and even to double and three times the proportion of bromide—and by these he had found that the proportion of five parts of iodide to one of bromide was the best. For other salts the proportion was, of course, different.

Some one asked for a good collodion recipe, and Herr REICHARD gave the following:—

Raw collodion at four per cent.	720 parts.
Alcohol	360 ,,
Ether	360 ,,

And for iodising:—

Alcohol	180 parts.
Iodide of ammonium	9 ,,
Iodide of cadmium	9 ,,
Bromide of cadmium	4 ,,

Herr LINDNER recommended this other:—

Alcohol	1500 parts.
Ether	2500 ,,
Gun-cotton	100 ,,

And for iodising:—

Alcohol	1000 parts.
Iodide of ammonium	30 ,,
Iodide of cadmium	30 ,,
Bromide of cadmium	20 ,,

Herr KOCH said that the same amount of wool did not always give the same results in a collodion; sometimes the film was thicker than at others.

Herr REICHARD said that when he made his own cotton he got very variable results, but during the past year he had bought Beyrich's four-per-cent. prepared raw collodion, and since then he had no trouble.

Some further remarks on the same point were made, and then

Dr. VOGEL gave an account of the Venus expedition, into which we need not at present enter.

Beyond this there was no business, and the meeting was adjourned.

Correspondence.

PHOTOCHROMY. — NEÔLEO-PEINTURE. — DEROGY'S HELIOSTAT. — THE FUTURE OF EMULSIONS.

IF we look back to the history of any great thing which has been done in art or science we find, almost without exception, that some one man possessed of an iron will and indomitable perseverance has been at the bottom of it. In an interesting work by Mr. Smiles, entitled *Self Help* (which I would earnestly recommend for perusal to my youthful readers), the fact above stated is illustrated by a large number of examples. But although our own beautiful art of photography has not, so far as I can remember, supplied the author with a single case, yet photographers can point to many men within their own ranks who, by their energy and perseverance, would have formed happy illustrations of the fact for which Mr. Smiles contends, whilst at this very moment we have a striking instance of it in M. Léon Vidal, of Marseilles. That gentleman, filled with enthusiasm for the charm of colour in a photograph, has endeavoured to realise this result in a way which must have struck every-one who first heard of it as almost hopelessly impossible—I allude to his process of photopolychromy—and yet he has succeeded! After years of laborious experimenting, and with difficulties to be surmounted at every step, he has gone on hopefully and pluckily until he has reached the goal at last. I have just seen in the *Moniteur de la Photographie* an article by its talented editor, M. E. Lacan, in which he says that he has before him for review a copy of a painting done by M. Vidal, by his new process, which goes far beyond all that gentleman's former efforts. The original is a painting by Karl Muller, from Goethe's *Faust*, including three figures; and the copy, which is said to reproduce admirably the effect of the original, is about 23 × 17 centimetres (9 × 7 inches). To quote M. Lacan's own words—"The colours blend and harmonise as if they had been spread by a skilful pencil. The specimen leaves far behind it all that could be accomplished by chromolithography."

The reader will bear in mind that in M. Vidal's process of photochromy the following points are gained, viz.:—First, a large number of coloured proofs, all identical in effect, can be produced from a single negative; secondly, the details of the photograph are not hid by the colours, because a print in monochrome from the entire negative is superposed upon the coloured ground; thirdly, the colours are not applied in flat patches, but each coloured patch shows all the gradations of the negative in that particular part. No such result as this can possibly be achieved by common chromolithography; and in order to realise the same effect by different means, recourse must be had to photocollography, and printing in coloured inks from a number of different films. Whether this latter method, or that of M. Vidal, will ultimately triumph it is difficult for anyone at present to foresee, but both may, perhaps, meet with a formidable rival in the process of neôleo-peinture, although the latter will require that each print shall be separately coloured by hand.

And this reminds me that the process of neôleo-peinture was demonstrated by M. Puttemans, at the last meeting of the Photographic Society of France, and seemed greatly to interest most of the members present. A portrait upon paper was completely coloured by that gentleman in about half-an-hour, and the result was much admired.

M. Lacan, alluding to this demonstration, says that although the principle of the process is not new, but has been known for many years, the method of M. Puttemans may now be turned to good account by provincial photographers, who, in the absence of a skilful artist always at hand, as in Paris, to colour their proofs, may do it themselves with tolerable satisfaction to their clients.

At the same meeting M. Derogy exhibited a heliostat reflector for use with a solar camera. The mirror, turned by clockwork, followed the course of the sun, and reflected its rays through the condenser. He also exhibited a simpler form of the apparatus, in which the mirror was turned by hand.

In an interesting little article by Mr. Stillman, at page 242 of this Journal, on the subject of collodio-bromide emulsions, he does much, I think, to clear away the veil of fog which some writers have cast over it by a misconception of the part played by free nitrate in the mixture. Mr. Stillman has now endorsed the opinion which I have always held, viz., that when free nitrate is really present—not in the emulsion, but in the sensitive film—it is impossible to get a good negative. Free nitrate may, no doubt, exist in the *emulsion*, so long as there still remains in that mixture, along with it and unconverted, some soluble bromide or chloride; but this free nitrate must always be washed out of the *film*, because the moment that an alkaline developer is poured upon a film containing free nitrate, or nitrate of silver combined with albumen or other organic matter, fog is produced over the whole plate by the reduction of the silver.

The key to many of the discrepancies which arise in the experiments of different operators in this process will be found in the fact that a soluble bromide or chloride may exist for a long time unconverted in the presence of free nitrate within a mixture so viscid as collodion; whilst the free nitrate is much more easily washed out of a film than the soluble bromide or chloride.

If the hope expressed by Mr. Stillman in his concluding paragraph is ever to be realised, it will be, I think, by employing the means of making the emulsion which I published some few weeks ago, viz., mixing dry and pure bromide of silver in a mortar with plain collodion, and adding thereto the necessary trace of soluble bromide and organic matter. Although an emulsion thus prepared might never give a film equal in sensitiveness to one which can be prepared by means of a bath, yet the emulsion would perhaps keep well, and be useful for all such subjects as do not require a very rapid exposure. In that case the emulsion process would, no doubt, have many attractions, from the very simple way in which dry plates could be prepared *en route*. There is, I am sure, a little fortune awaiting the happy man who shall be the first to perfect such a process, and put into the hands of the trade a formula by which the sensitive emulsion could be prepared. Of course the films would require no washing or organifier; the mixture would only have to be poured over the plate, the film would dry immediately, and be then ready for use when required. THOMAS SUTTON, B.A.

May 29, 1874.

THE GELATINO-PELLICLE.

To the EDITORS.

GENTLEMEN,—Your able correspondent, Dr. Nicol, has expressed surprise that so little has been heard lately respecting the new pellicle; and Mr. Kennett has again invited those who have tried his preparation to give the results of their experience, whether successful or otherwise. As nearly three hundred photographers have been supplied with the preparation, I can only suppose that each man is waiting for his neighbour to begin. Having assisted at the birth of young Pellicle, and having been assured by his anxious parent that I stood in the light of a godfather to the promising youth, I naturally feel interested in his advancement, and hasten to relate what I know about him.

My first experiments were by no means successful. Knowing the extreme sensitiveness of the preparation I drew the curtain over the window of my dark room, and lighting a mere spark of gas proceeded to coat the plates, the gas being carefully shaded, meantime, by an orange-coloured glass. When I had got through this, and laid them carefully on a flat table, I was obliged to leave the room for some purpose; upon my return I found that my assistant had turned on the gas, as he assured me "he wanted to see"—that was all. Unfortunately it was not quite *all;* for the plates also had "seen" the light, and the whole batch was spoiled. On the first three or four we tried we could get no image at all; and after that the rest were faint or fogged.

One of my early mistakes was in pouring the emulsion on the cold plates; this caused them to dry unevenly. The next was over-exposure. Following the formula for dry work I gave about half as long again as for the ordinary wet collodion; for the inventor was not aware at this time of the extraordinary rapidity of his plates. The exposure was really about ten times as long as it should have been. In both these cases I was misled—in one case by the directions, and in the other by the want of them. As Mr. Kennett is to read a paper on the subject at the next meeting of the London Photographic Society I hope he will favour the photographic community with the most minute particulars, starting with the idea that the larger portion of his audience know absolutely nothing of the gelatine process, which differs in many particulars from the ordinary collodion work, and where, from the extreme sensitiveness of the material, the least error must be fatal. The earlier experiments were made in the winter time, and we all know what that means. By perseverance I succeeded in overcoming the principal difficulties. All who have seen the specimens exhibited must have admired the fineness of the films and clearness of the image—"*Chiare, fresche, e dolce,*" as Petrarch expresses it.

The extreme rapidity must also be manifest to those who have succeeded in getting an image at all. In the fraction of a second required to flash a light upon the negative and prepared plate I have obtained by contact printing a perfectly-exposed transparency; even by gaslight I found about three or four seconds suffice. With regard to the exposure for negatives out of doors this extreme rapidity is manifest enough.

I must here state at once that my experience in working other dry plates is very small indeed, and even that little of the most recent date. "Comparisons," as the learned Dogberry assures us, "are oderous," and it may appear invidious to compare the pellicle plates with those of another sort; yet it is only by doing so that we are enabled to judge of their different qualities and degrees of excellence. The only other dry plates that I have seen in use were six of Colonel Stuart Wortley's, 10 × 8 size, prepared by Colonel Wortley himself, and exposed by Mr. Crawshay and Mr. H. P. Robinson, when I recently partook of the generous hospitality of Cyfarthfa Castle. The plates were exposed in the fresh mountain air of Talybont; time from thirty-five to fifty-five seconds. Upon being developed next day they were found to be slightly under-exposed—those that had the longest being the best. Of course, with my limited experience, I do not give this as the average of a Wortley plate; I merely speak of what I saw. The weather was heavy and the clouds charged with rain, of which we had soaking proofs before we reached home. Now comes the rub, however. With the pellicle plates, under the same conditions, an exposure of four or five seconds would, I believe, have sufficed.

I will not further take up your valuable space. Those who have succeeded will require no encouragement to persevere; to those who have *not* succeeded I would quote the little song familiar to most of us in our juvenile days, and if they "find the task is hard" I certainly advise them to "try, try again." They will have some difficulties to encounter, especially in keeping light from the plates; but I believe they will, in the end, be rewarded by the results. Fortunately they can do this at a very small cost. Mr. Kennett has been advised by his friends—myself included—to raise the price of his preparation to something like a level with that of his predecessors; but, although out of pocket by his invention, he has not done so. I hope, therefore, the qualities of young Pellicle will be amply tested during the short interval of fine weather which we in England agree to call "summer."—I am, yours, &c., R. W. ALDRIDGE.

221, *Cornwall-road, Notting-hill, W., June* 1, 1874.

To the EDITORS.

GENTLEMEN,—Having had some experience with Kennett's pellicle, and seeing by letters in your Journal that others, older in photography, have had only moderate success in using it, I wish, in accordance with the suggestions of Dr. Nicol and Mr. Kennett, to say that in my hands it has given good results with remarkably short exposures, both in the camera and by contact printing for transparencies; and I have seen work by others that is really beautiful in the details of foliage and in the shadows.

Somewhere in the photographic literature of the year I have read that the thing needful, and to be worked for, was to secure, by some process, plates more sensitive than any yet made. I think that the pellicle plates meet this requirement most effectually; for, with reasonably good light, and not excessively small stops, instantaneous pictures can be taken without that extraordinary care required to get such effects by the wet process, and with the advantage that you can wait until just the right moment for exposure arrives, without the agony of feeling all the time that your plate is getting dry.

Some gentlemen with whom I have conversed complain that it is "sticky" and "messy," and others do not like it because it is necessary to work in the minimum of light. To the former, from my own experience, I can say that with a little practice and care it is quite easy to coat a dozen plates without spilling a drop, so that you need not know but that you are using so much ordinary cream. To the others I submit that it is a little unreasonable to expect to work without fog with what is probably the most sensitive material made in the same light that they would sensitise albumenised paper.

In last week's Journal I notice that Mr. M. Carey Lea is particularly severe on gelatine negatives. He makes one point—that the film won't adhere to the glass. This does not apply to the gelatino-pellicle film, for I find that when I wish to clean some old plates my greatest trouble is to get it off—not as an entire film, but at all. It can be soaked in water for hours, scored across with the nails, and then it won't come off without hard rubbing in hot water. Another point is made that the varnish does not penetrate and become a part of the film as in a collodion plate, but forms a separate coating above, so that dampness would cause unequal expansion, split the film, and ruin the negative. It appears to me that in this case the gelatine film would be hermetically sealed between a coating of varnish and the glass, and so in the best possible condition to be preserved from dampness. I have yet to see a gelatine film split from any cause, and apprehend that the possibilities of their being free from that difficulty quite equal those of collodion films.

As to dust: everyone knows that it is the worst of the photographer's enemies. By coating the plates the last thing before leaving the operating room for the night, and, when going out, opening the door very gently so as not to create a draught of air, thus stirring up the dust, a certain degree of immunity will be secured. Ordinary care in washing and drying will prevent the injury by dust that Mr. Lea suggests.

Those who give the pellicle a fair trial, making no innovations in Mr. Kennett's formula before mastering it, will find in it a simple and efficient material for dry-plate work—sure in its results and economical to use.—I am, yours, &c., E. F. BRADLEY.

5, *Whitley Villas, Holloway, June* 1, 1874.

BROMIDE EMULSION PLATES.

To the EDITORS.

GENTLEMEN,—I am afraid those who write much in the Journal do not always read what others write, or else your good but voluminous correspondents, Messrs. M. Carey Lea and Thomas Sutton, would scarcely fill your sheets with experiments and discoveries made long before.

It is more than two years since that I first recommended, in the Journal, putting bromide emulsion plates into the preservative before washing, and without washing. In several letters since I have proclaimed this as my usual custom, and have urged it as a conclusive argument against the excess of silver recommended by Colonel Stuart Wortley being washed out before the plate was immersed in the preservative. I also stated that my favourite preservative was two grains of pyrogallic acid to the ounce of table beer—a pretty strong one. Yet Mr. M. Carey Lea writes as if it was something quite new. And then his experiments with albumen are really almost enough to frighten any ordinary photographer from attempting to make bromide plates! What we all want, and what I believe we have now got, is the very simplest, surest, clearest, densest, and most rapid dry plate which the best qualities permit. As I said the other day, I have never tried plates possessing all these qualities together in greater perfection than those which Colonel Wortley sent me, and of which I have now made eight dozen from an emulsion which I prepared from his organic collodion.

But putting these aside (as not yet published), will Mr. Lea just try an emulsion made with a good dry-plate collodion containing eight grains of bromide of cadmium to the ounce, sensitised with fifteen or sixteen grains of nitrate of silver dissolved in alcohol, with the addition of two drops of hydrochloric acid? Let it stand twenty-four hours. If too thick, thin with a little ether and shake and filter it, coat his plates, place them at once in his own or any good preservative till free from greasiness or bubbles, rinse, and dry rapidly. I believe he will find the result a rapid, clear, and dense plate without any occasion for intensifying; at all events I do. Colonel Wortley's new plates are better, but really these are good enough for any practical use; and these, remember, are made with his original proportions of bromide and silver.

But I implore Mr. Lea to give up *aqua regia*, or any mixture of *nitric acid*. The pure *hydrochloric* acts by making a chloride and liberating sufficient nitric acid to prevent the emulsion being alkaline, which is all that is required. I defy you to fog these plates by ammonia.—I am, yours, &c., ST. VINCENT BEECHEY.

P.S.—Permit me to add that I have never *backed* a bromide plate for two years. Place a piece of *bright yellow* (not black) paper between your slides, and not the slightest blur will ever take place; all the reflected light is yellow.—ST. V. B.

June 1, 1874.

[Seeing that the reflected light which causes halation, or blurring, proceeds from the back surface of the glass plate, the colour of the paper put behind the plate will not influence the halation unless placed in *optical* contact with the plate. Hence, if the yellow paper be made quite wet when applied to the glass, it will act in a manner entirely different to what it would do if used dry.—EDS.]

COLLODIO-CHLORIDE.

To the EDITORS.

GENTLEMEN,—Your remarks on the instability of collodio-chloride prints on opal glass have surprised me not a little, my experience having been so far in the opposite direction that I have long regarded the process in question as being the most stable of all forms of direct printing in silver. I have kept a print on opal glass continually exposed to the air for a space of nine years without the slightest indication of fading; and I have recently seen two opal pictures, printed by myself immediately subsequent to the discovery of the process, and they remain as bright and blooming as they were in the first hour of their production.

I can only account for the decay of such pictures by attributing the cause to imperfect fixation and washing. The method I observe is to treat the opal print in precisely the same manner as a careful photographer is wont to deal with a hypo.-fixed negative.

It is quite possible that the samples of collodio-chloride used by some contain a quantity of free citric acid. That would tend to hasten fading, doubtless, by the liberation of sulphur, directly the film is brought into contact with hypo.; but I have no hesitation in saying that fading is not an inherent defect in the process. When collodio-chloride prints fade the fault is in the producer, and, therefore, might easily be avoided.

With reference to Mr. Henderson's remarks: whilst thanking that gentleman for his allusions to myself, I cannot omit to observe that I deeply regret the bitter feelings which are being indulged in by photographers; and what, after all, is the paltry honour of having suggested or practised some new thing compared with the welfare of an art which years ago its followers loved so well? I am old-fashioned enough to be true to the old love still, and therefore have no wish to see justice done to myself at the expense of harmony, by which alone can photography continue to improve.—I am, yours, &c., W. T. BOVEY.

June 2, 1874.

COPYING PHOTOGRAPHS.

To the EDITORS.

GENTLEMEN,—For many years past the minds of photographers have been greatly exercised by the action of certain persons calling themselves "copyists," who for a small sum will supply a quantity of copies from a *carte* or other photograph sent to them for the purpose. This deprives the photographer of a portion of his just and lawful gains, as, but for the copyist, he would have had the order for the extra copies from the original negative in his possession. The public generally seem to consider the copies, however inferior, quite good enough to give away to the ordinary run of acquaintances, the original *cartes* being reserved for the more select circle of intimate friends. There is also the damage done to the reputation of the photographer, as both the originals and copies are frequently given away as being produced by him.

Any means of checkmating that photographic parasite—the copyist—and spoiling his "little game" would, no doubt, be welcomed by the majority of photographers. Perhaps the following suggestion may have the desired effect:—On page 156 of your present volume there is an account of some experiments with quinine, by which it appears that a device drawn on white cardboard with a solution of that drug, though invisible to the eye, will yet photograph as a dark pattern on a white ground; therefore, why not immerse our photographs in a solution of quinine, thereby making them, to a certain extent, non-actinic, and so render the copying of them very difficult, if not impossible? Whether the application of quinine would be injurious to the permanence of the photograph I am unable to say; I simply offer the suggestion for what it is worth.

There can be no doubt that any means by which the copying of photographs could be prevented would add greatly to the value of the original negative, as all orders for extra copies or enlargements must be sent to the photographer who holds it.—I am, yours, &c., F. B.

June 3, 1874.

BACKING PLATES.—PRESERVATIVES.

To the EDITORS.

GENTLEMEN,—Several years ago I was the first to suggest in your columns the backing of dry plates with coloured collodion. Writing as I did immediately after my discovery of the method, I suggested the use of iodine as the colouring agent; but I soon found (as Mr. M. Carey Lea pointed out) that free iodine in the dark box would not do; and I tried many things—roseine, gamboge, Judson's orange dye, turmeric, &c.—until about two years ago a friend who is a large maker of aniline dyes gave me some aurine. Since then I have used nothing else, but I am sorry to say that other people do.

Five weeks ago I suddenly determined to go to the lake district for a week, and as I had no plates ready I got two dozen commercial dry plates. They were all backed with some vile compound of gum and ochre, and the consequence was that, after spending a good deal of time and money in exposing them, I had not a single picture that was not crowded with dust-holes. Ochre is dirt, dirt is dust, and dust will spoil any plates. Why, then, do our commercial dry-plate people persist in using such rubbish?

My experience does not at all correspond with yours respecting the addition of albumen to the mixed preservative recommended by Mr. Lea. I prepared a batch of plates from old solutions of tannin, gallic acid, and gum and sugar, to which I added albumen. There was no precipitate; indeed, I plunged the plates in the mixture without filtration. They were very good plates, and that albumen was present in the preservative bath I feel certain from the multitude of air-bubbles on the plate. In drying they all vanished, and left no trace behind.

I am now, however, using a new preservative which is exceedingly simple, and which is the best I have ever tried. To six ounces of Bass's bitter ale I add two drachms of albumen prepared with acetic acid, as recommended by Mr. Lea. There is no coagulation or precipitate whatever. I plunge the plate as soon as set in this bath, let it stay in five minutes, drain, and dry. Better plates I have never used, and I believe that any collodio-bromide emulsion which is in working order will do. I have also found that an emulsion which fogs badly when the plate is immersed in water does not fog at all when plunged in this ale and albumen bath. This, I think, is a fact which may lead us to important results.

Common sense ought to have taught us long ago that, for the best results to be attained, as the alcohol and ether escape from the film their place should be occupied by the preservative and not by water.—I am, yours, &c., GEORGE BROOK, JUN.

Fernbrook, Huddersfield, May 30, 1874.

SPOTS ON DRY PLATES.

To the EDITORS.

GENTLEMEN,—I must thank Mr. Sutton for his reply to my letter. I have been making a series of experiments as to these spots. I noticed, on taking the plate out of the bath and allowing to drain for a minute, several minute excrescences on the film. On drying and exposing the plate these spots became visible under the action of the developer, but with albumen wet they did not. They were also produced by coating the plate, putting it into distilled water until the greasiness had gone, and draining.

Of four samples of collodion, bromised with eight and twelve grains of bromide of cadmium, all were very slightly acid. The bath was eighty grains of nitrate of silver per ounce, acidified with nitric acid, and had been filtered through best filter-paper, the plates being passed through four baths of fresh distilled water. In fact, I use only distilled water, except for very common washing purposes ("lavish," you may say; it is, however, cheap to me, as I have it close at hand, always going). I prepared four dry plates with the same collodion, time in bath, &c., only different organifiers, and dried spontaneously. No. 1. Alkaline albumen (made alkaline with ammonia).—No. 2. Acid albumen (glacial acetic acid—only trace of acid).—No. 3. Albumen three parts, three-grain pyro. solution one part (decidedly acid).—No. 4. Blair's gum and tannin (alkaline). Exposed same time, developed with strong alkaline developer. No. 1. Spots again.—No. 2.

Clean and no spots.—No. 3. Clean and no spots, under-exposed, being too acid an organifier.—No. 4. Full of spots and blisters.

I again prepared a plate with acid albumen—no spots, and clean. Again prepared another with albumen and gallic acid, just to change the albumen from alkaline to acid, development as usual—no spots, and a nice plate. I see Mr. M. Carey Lea also likes gallic acid.

From these experimental plates I gather that, by using a slightly-acid albumen organifier, I can get reliable dry plates, whereas with alkaline albumen I could not do so. It certainly has cured the evil I complained of to Mr. Sutton.—I am, yours, &c., GEO. W. H. BROGDEN.

Coytruben, Bridgend, June 1, 1874.

SILVER RESIDUES.

To the EDITORS.

GENTLEMEN,—As a supplement to the remarks which appeared in last week's Journal on the above subject, I may mention that for some years I took the whole of my residues to a professional reducer, who I thought honest. Taking the advice contained in a well-known book, to "prove all things," I carefully divided my last lot of residues into two equal parts, one of which I took to my old friend and the other to another professional reducer. The result was that my new friend gave me *over twenty per cent.* more value than my old friend.

Moral: If you desire to know when you are getting full value for your residues, send them to *more than one* reducer, and note the result from each.—I am, yours, &c., THOMAS FORREST.

Pont-y-pridd, May 27, 1874.

THE FERRANTI-TURNER PROCESS.

To the EDITORS.

GENTLEMEN,—In your issue of Friday last Mr. Winstanley states that the first licensees of the Ferranti-Turner process purchased their rights on the 8th of October, 1872. Any reader who will turn to your issue of December 27, 1872, will find on page 622 that application for patent 3,069, for the "Artistic Treatment of Photographic Portraits," was made by "Cæsar Ferranti and Edward James Turner" on the 17th of October, 1872—that is, nine clear days after the alleged sale.—I am, yours, &c.,

Blackpool, May 30, 1874. W. E. BATHO.

EXCHANGE COLUMN.

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

The *Practical Magazine*, first and second volumes, complete and perfect, in exchange for a good quarter-plate bellows camera, lantern appliances, or slides, chemical apparatus, or offers. Also, a first-class pair of eye preservers (horse-shoe shape) will be given for a half-plate glass bath in pine case, view negatives, interchangeable chromatrope with designs, or offers.—Address, W. L. BREARE, photographer, Burley-in-Wharfdale, near Leeds.

ANSWERS TO CORRESPONDENTS.

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

G. RAMSAY.—Next week.

F. PARSONS (Leicester).—Received. In our next.

W. A. F.—We are much pleased to hear of your success. Do not make the proposed alteration on the lens, for you will spoil it.

PROCTOR.—Develope first with iron until all the details are out, then wash, and apply the pyrogallic intensifying solution, adding two or three drops of silver to it.

X. Y. Z.—When cleaning your lenses you have put them wrongly together. The convex crown glass lens must be placed next to the ground glass end of the tube, the side that is most convex being next to the flint lens.

INQUIRER.—We know nothing of the company respecting which you inquire, and, therefore, we are not aware where their "city" offices are situated. Yours is not the first inquiry we have received concerning this "company."

NOVICE.—What is said to be a capital optician's cement is—resin, one pound; and dry plaster of Paris, four ounces. Some, however, prefer for delicate work—bees' wax, one ounce; resin, fifteen ounces; and well-dried whiting, four ounces.

J. BROWN.—The sample of nitric acid sent is *very* impure, and it is no wonder at all that you have failed so signally in your experiment. The chief impurity in it is hydrochloric acid, in presence of which nitrate of silver cannot exist, being precipitated in the form of chloride.

G. R. T.—It is desirable to rinse out the ebonite bath first with acidulated and then with plain water. It is not advisable to leave the silver solution standing long in a bath of this material, although we are aware of several instances in which it has been left in for months without suffering harm.

ROBT. BRIDGART.—1. A useful way of conducting alkaline development in connection with the process you practice is to apply a two-grain solution of pyrogallic acid, to which is added a mere trace of ammonia (or solution of carbonate of ammonia), together with two or three drops of a ten-grain solution of bromide of potassium.—2. Bromide of potassium and carbonate of ammonia must be dissolved in water, not in alcohol. The solutions keep well.

CARBON ENLARGEMENT.—Mr. Wingrave, of Coventry, has sent us a fine autotype enlargement of Coventry cathedral. It is admirably adapted for framing, and forms a charming picture, its excellence being unspeakably enhanced by the fact of its imperishability. All photographic works worthy of being handed down to posterity ought to be printed in carbon; and we hope that in a little time the picture-purchasing public will be so educated as to insist upon permanent prints being supplied to them.

J. J. A.—It would have been desirable had you detailed your wants in the more definite form of numbered queries, because at present we do not gather from your letter whether you are or are not acquainted with photolithography. The information recently published in this Journal concerning photolithography, both by the transfer process and that of a gelatine film (*à la* lichtdruck), has been so copious, so practical, and so full of detail that we really have nothing more to add at present to what is now accessible to the world.

A. L. STEAVENSON.—We are always sincerely desirous of assisting beginners; but, in publishing articles and correspondence, we must take for granted that mere elementary information is not required in the case of the great majority of our readers. To meet the case of those who have had but little experience we, in our ALMANAC for 1863, gave, at a considerable expenditure of time and space, very minute directions in all that was connected with elementary instruction, and we assumed that that course of lessons to beginners would meet the case of amateurs in your position. Hence to repeat formulæ every time that mention is made of intensifying with pyro. and citric acid, and to say what is "meant" when recommending a final wash of gallic acid to a collodio-albumen plate would be an unwarrantable encroachment on our space. Writers in the Journal assume that its readers have passed beyond the elementary stage. So much for the subject in general. In particular: a final wash of gallic acid means the application of a saturated, or three-grain, solution of gallic acid to the prepared plate after washing and before drying. As regards the other matter, what Mr. York meant was that only so much carbonate of ammonia should be added as would neutralise the acid present, the amount of which varies with every sample. This can only be determined by experiment. We shall at all times be happy to give you details concerning any matter on which you are not quite clear.

RECEIVED.—*The Amateur's Photographic Guide Book*, by W. J. Stillman. A notice of this work will appear in our next number.

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

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, on Thursday next, the 11th instant, at the Rooms of the Society of Arts, a demonstration of the method of reproducing negatives by the Obernetter process will be given.

RESTORATION OF COLOUR.—When colour on a fabric has been accidentally or otherwise destroyed by acid, ammonia is applied to neutralise the same, after which an application of chloroform will, in almost all cases, restore the original colour. The application of ammonia is common, but that of chloroform is but little known.—*Photo. Mosaics.*

METEOROLOGICAL REPORT,

For the Week ending June 3, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
28	30·03	WNW	49	53	71	42	Cloudy
29	30·06	W	56	60	67	56	Cloudy
30	29·89	W	55	62	74	51	Fine
June.							
1	30·19	W	59	64	75	50	Fine
2	30·05	SE	61	67	81	51	Cloudy
3	30·16	W	57	60	—	54	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 736. Vol. XXI.—JUNE 12, 1874.

A SIMPLE METHOD OF IMPROVING CERTAIN LANDSCAPE NEGATIVES.

Our readers, we are sure, will not accuse us of any partiality for retouching, although we are about to recommend a somewhat extensive use of the blacklead pencil. While out for a photographic day with a few friends, last week, we came in view of an exceedingly tempting "bit," and resolved to secure it if possible. It consisted of a wayside cottage with thatched roof, standing in a small garden with rustic palings, and quaint old trees of various shades of colour. The foreground and distance were nearly perfect so far as concerns composition, the only fault being the one thing over which we had no control—lighting. On the right the cottage and accessories were in brilliant sunshine, while the large elms, and plane-trees in dense foliage on the left were in deep shadow, and even the little light that was on them was filtered through innumerable layers of green leaves, being, in consequence, of the smallest possible photographic value. With a view to get as much as practicable out of the shadow we gave a long exposure, and hoped by careful development to get a presentable photograph of the charming subject.

In developing we commenced with an ounce of a four-grain solution of pyrogallic acid, eight drops of a ten-grain solution of bromide, and two drops of a drachm-to-the-ounce solution of ammonia. With this the cottage and most of the well-lighted objects, including the pretty glimpses of sunlight shining across the road, started out at once; but the whole of the left side of the picture failed to show any trace of an image. On the addition of six or eight drops of the ammonia solution, however, there was an indication that it had been impressed, and after a while the detail began to appear in tolerable abundance.

At this stage of the operation the real difficulty commenced. To give anything like printing intensity to the feeble details of the shaded parts much more development was required; while, on the other hand, the beautiful gradation of the cottage and its surroundings were exhibiting manifestations of being about to lose their transparency and delicacy, on which the charm of a print so much depends. Unwilling to lose the delicious detail of the shadow, but more unwilling to sacrifice the only thing that gave that shadow value, we decided to stop the action, washed off the developer, and fixed the plate, which, on examination, proved, with the exception of the weakness already mentioned, all that could be desiderated in a good negative.

Now, various plans have been, from time to time, recommended for the purpose of overcoming the difficulty of getting good prints from such faulty negatives; and, as the conditions under which they are produced are not by any means of rare occurrence, it is a matter of considerable importance to hit on a method at once simple and efficacious. The late Mr. Clarke, of Edinburgh, whose collodio-albumen negatives were well known, used to develope with pyrogallic acid alone, or with gallic acid and a mere trace of silver, and generally occupied from twenty to thirty hours in the operation. His mode of improving weak parts was to varnish each portion of the negative as it came up to printing density, and then continue the development on the parts requiring to be strengthened. In this way he occasionally took as many as a dozen prints from a negative in the course of the development, each time varnishing the perfect, and continuing the development on the weaker, parts before he got it to his satisfaction. Few of our readers, we suspect, will care to take so much trouble, and therefore we must look for some easier means of overcoming the difficulty.

A very common method is to apply a wash of yellow colour, such as iodine in collodion; but the results produced in this way are not satisfactory. In our opinion by far the best method is one we some time ago saw practised by Mr. Valentine, of Dundee, and which was the one we successfully adopted with the negative already alluded to. It consists in grinding the whole or part of the back of the negative, and then working it up to any required extent with a blacklead pencil, the roughened surface of the glass being as easily worked upon as paper; and, as the pencil markings can be readily rubbed out, there is hardly a limit to the delicate gradation which may thus be secured.

The negative on which we saw Mr. Valentine at work was a street view, with trees in the foreground. The sun had been shining on one side and on the distant portions of the view, and the trial print was altogether unsatisfactory, the trees being quite black long before the distant parts were half printed. He laid the varnished negative, face downwards, on a pad of soft paper, and sprinkled over the back some fine emery and water. Then with a triangular piece of glass—in fact, an ordinary chandelier prism—ground away with a circular motion, supplying fresh emery and water from time to time, till the whole surface was sufficiently roughed. When this part of the process had been completed to his satisfaction, the surface was cleaned with a wet sponge and dried, and then he set to work with the pencil on all the dark or under-exposed parts. The effect was truly magical, an apparently useless negative being in a very short time converted into one the prints from which have ever since commanded a ready sale.

Of course we do not say that every person can on the first attempt prove as successful as Mr. Valentine. It is skilled labour, and of course requires some practice to do it well. The requisite ability, however, is easily acquired; and we heartily commend the matter to the attention of our readers—not, of course, as anything new, as it has been known and practised by a few operators for a considerable time, but as a method at once simple and satisfactory, and one not so well known as it should be.

ON SOME OF THE LESS-KNOWN METHODS OF PRODUCING OPALOTYPES.

We believe we are correct in attributing to the senior member of the firm of Ross and Pringle, photographers to the Queen, Edinburgh, the position of being the first who produced a print upon glass by direct or full printing-out. Excellent transparencies, some of which had been used *as* such, and others backed with a white material so as to be examined by reflected light, had been made long prior to that period, these, however, having been produced by development; but we are not aware of any special process for producing them wholly by the printing-frame having been published until 1857, when Mr. Ross, at a meeting of the late Photographic Society of Scotland described this as one of the methods employed by his firm in the production of a class of pictures for which they were much famed. This paper proved the means of inciting many to try transparency printing both on plain and on opal glass. One very good picture of this kind, still in our possession, and which bears the date of August, 1857, was produced from the following directions supplied by Mr. Ross, the medium being albumen:—To the white of each egg add fourteen drops of a saturated solution of chloride of soda, beat well up, and with this coat the glass. When dry sensitise in a seventy-grain silver bath, and again dry and expose in the printing-frame under a negative. Fix and wash in the usual way. This, in substance, comprises the instructions then given by Mr. Ross, which were modified by the substitution of collodion for albumen. For two years previous to this time wonderful properties had been publicly claimed by Herr L. G. Kleffel, of Mecklenburg, for a very large addition (six drops of a *saturated* solution per ounce) of chloride of sodium to iodised collodion; and, owing to the rapidity with which collodion set, and its general handiness compared with albumen, it found more favour, at least in the eyes of ourselves and friends, than albumen. Instead of the aceto-nitrate of silver bath employed by Mr. Ross the changes were rung on other acids, such as gallic, tartaric, succinic, and others.

The general excellence and convenience of this nearly-forgotten method of printing opalotypes or transparencies are such as to induce us to bring it prominently under the notice of our readers, together with a few modifications which will conduce to its further simplification.

When chloride of sodium is added in such proportion to collodion as above—that is, fourteen drops of a saturated solution to the ounce—the collodion is apt to become disintegrated and rotten from such an addition of water. The remedy for this is of a twofold character:—First: let the solvents of the collodion be of the strongest kind possible; happily *purity* of the ether and alcohol is in this process of minor importance, neither fogging nor pinholes resulting. Secondly: instead of employing chloride of sodium in an aqueous solution, employ another chloride in an alcoholic solution. As a guide to the intelligent experimentalist we annex the names and degrees of solubility in alcohol and ether of several chlorides:—

Aluminium—Soluble in two parts of cold alcohol.
Ammonium—Sparingly soluble.
Barium—Insoluble.
Cadmium—Very soluble.
Calcium—Soluble in eight parts of cold and one of hot alcohol.
Cobalt—Moderately soluble.
Iridium—Insoluble.
Lead—Insoluble.
Lithium—Very soluble in both alcohol and ether.
Mercury—Soluble in two and a-half parts of alcohol.
Nickel—Moderately soluble.
Potassium—Scarcely soluble in cold, but is so in forty-eight parts of boiling, alcohol.
Sodium—Scarcely soluble in cold, but is so in forty-eight parts of boiling, alcohol.
Strontium—Soluble in six parts of alcohol.
Uranium—Easily soluble.
Zinc—Very soluble in alcohol and ether.
Zirconium—Abundantly soluble in alcohol.

Unfortunately the various authorities on the solubilities of chlorides which we have consulted differ so much as to prevent us from giving the degrees of solubility more proximately than we have here done.

From the foregoing it will be seen that a variety of chlorides—many of which will answer admirably—are thus placed at the disposal of any person desirous of trying his hand as the inventor of a new process. He has merely to select from the list of chlorides presented any one suiting his fancy not previously recommended, and boldly make his claim. The combining proportions being obtained, he will see at a glance what relation one bears to the other, and will thus be saved even the trouble of making an arithmetical calculation.

Having obtained a simple chlorised collodion, the plate coated with it is next sensitised in nitrate of silver, which should be made decidedly acid with one or other of the organic acids which remain in harmonious union with an argentic solution.

On examining a number of opal pictures we have just completed by means of a variety of modifications of the sensitising bath, preference has been shown for one prepared in the following manner:—It will be in the recollection of our readers that some years since we recommended, as a substitute for the very acid bath found best for the coffee process, the use of the plain negative bath without any special excess of acid, but the imparting of the requisite acidifying by means of a special acidulous solution applied to the surface of the plate after its removal from the bath. The advantage of such method of proceeding, both in the coffee process and in that now under discussion, is that no special bath other than the one in ordinary use is required.

The label on the back of the best picture of the series referred to intimates that after the chlorised collodion plate was excited in an ordinary thirty-five grain negative bath, a little of a solution of tartaric acid and nitrate of silver (thirty grains of each to the ounce), which was used for intensifying negatives, had been poured over its surface, after which it had been dried before the fire in a room into which a subdued light had been admitted through Venetian blinds, the plate being afterwards printed, toned in an acetate bath, and fixed as usual. A citro-nitrate solution also produces good results, and there is no doubt that pictures of an equally excellent kind may be obtained from a considerable number of organic acids.

This article may fall under the notice of some who might be desirous of trying the method of printing recommended, but who, from residing in secluded portions of the country or otherwise, may not have the convenience of making or obtaining a supply of chlorised collodion. This need not deter those so isolated from trying this method, for by a very simple substitutionary process the iodide in an iodised collodion film—nay, the metallic silver in a developed image—may be converted into the chloride, and this substitutionary process is well worth the attention of such experimentalists. In 1865 Mr. M. Carey Lea introduced a method of chlorising negatives—that is, of converting them into the chloride of silver. The solution he recommended for this purpose was composed of three drachms of a saturated solution of bichromate of potash, one drachm of hydrochloric acid, and six ounces of water. These proportions need not really be strictly adhered to, but may be varied to a considerable extent. Suppose a developed picture immersed in this: it rapidly becomes converted into chloride, and at the complete stage nothing can be more beautiful.

This, we need scarcely observe, is one of several ways in which a solution of chlorine may be made, and every chemist knows that a solution of chlorine will effect the conversion of iodide as well as other forms of silver into the chloride. Hence, to convert an iodised collodion film into a chlorised one, it is only necessary that the plate which has been coated with ordinary negative collodion and sensitised in an ordinary negative bath be washed and immersed while wet into such a solution as the one above described, for which purpose it must be used much stronger.

The chlorine solution we have employed in preference to all others is made by putting a teaspoonful of ordinary chloride, or hypochlorite, of lime (such as is used for disinfecting purposes) into a flat dish containing a few ounces of water, and, after agitating it, adding a few drops of hydrochloric acid, by which a copious evolution of chlorine takes place, most of which is absorbed by the water. Into this the washed plate is put, and after a very short time it is chlorised, the iodide being converted into chloride. It is now removed, rinsed, and a little of the tartro- or citro-nitrate of silver solution already mentioned poured over it, and allowed a minute or two to penetrate. It is now dried either by heat or otherwise, and is ready for exposure. Print rather deeply, and then tone and fix as usual.

ON THE USE OF ALDEHYDE AS A DEVELOPER.

In our previous article we described the ethylic aldehyde, and gave a glance at the ordinary processes for its manufacture; it now behoves us to detail the reaction by which it reduces the noble metals, and silver in particular.

It is well known that there is a homologous series of acids, which are derived from, or bear a relation to, a corresponding series of alcohols. Some of them include a few of our best-known products from the organic world. The aldehydes are derived from the alcohols by the abstraction of a molecule of hydrogen (two atoms), and the aldehydes are then converted into the respective acids by the addition of an atom of oxygen, thus:—

$$\underset{\text{Alcohol.}}{C_2H_6O} - H_2 = \underset{\text{Aldehyde.}}{C_2H_4O}$$

and

$$\underset{\text{Aldehyde.}}{C_2H_4O} + O = \underset{\text{Acetic acid.}}{C_2H_4O_2}$$

There are a great number of aldehydes already discovered, and before we dispose of the chemistry of these substances we may as well suggest that many of them, although untried as reducers, might possess particular interest to the photographer. Besides some others, it is generally considered that many of the essential oils consist of aldehydes. Thus the chief ingredient in bitter almond oil is benzoic aldehyde; cumic oil contains cuminic aldehyde; but these products become converted into the respective acids by the oxidising influence of the air. We may mention that, to procure the respective aldehydes, the simplest method would be to distil the barium salt of the respective acids with a formate, thus:—

$$\underset{\text{Benzoate of barium.}}{\left.\begin{matrix}C_7H_5O\\ Ba\end{matrix}\right\} O} + \underset{\text{Formate of barium.}}{\left.\begin{matrix}CHO\\ Ba\end{matrix}\right\} O} = \underset{\text{Benzoic aldehyde.}}{\left.\begin{matrix}C_7H_5O\\ H\end{matrix}\right\}} + \underset{\text{Carbonate of barium.}}{\left.\begin{matrix}CO\\ Ba_2\end{matrix}\right\} O_2}$$

The acids are easily got; but the fresh oils would, perhaps, not be so easily procured.

In our previous article upon this subject we found that the crude ethylic aldehyde had been converted into an aldehyde-ammonia to procure the aldehyde from that substance. To obtain the aldehyde itself the crystalline aldehyde-ammonia is dissolved in two parts of water, and after mixing with a dilute acid, obtained by adding three parts of sulphuric acid to four parts of water, it is gently distilled on a water bath. The receiver must be kept as cool as possible, because the product thus obtained is extremely volatile.

We have now before us a series of experimental plates taken by Mr. J. Robinson, of Dublin, in his usual careful manner. Each of these plates represents an experiment, and we shall detail such of them as bear with any amount of interest upon the development of photographic science.

Let us remind our readers of one of the equations given above, by which we see that an equivalent of aldehyde requires one atom of oxygen to form acetic acid, and that such a reaction will produce a molecule of any monad metal, such as silver. Thus—

$$\underset{\text{Aldehyde.}}{C_2H_4O} + \underset{\text{Oxide of silver.}}{Ag_2O} = \underset{\text{Acetic acid.}}{C_2H_4O_2} + \underset{\text{Silver.}}{Ag_2}.$$

Now this is exactly what takes place. In the test-tube, particularly if we apply heat, an alkali must be found to neutralise the acid of the silver salts. Take, for instance, a solution of aldehyde-ammonia and nitrate of silver, or reverse it by taking a solution of ammonio-nitrate of silver and aldehyde, as it is quite immaterial which—say a drop of the latter to a large test-tube full of the solution of silver salt—and gently warm it. The silver is deposited in a beautiful burnished mirror upon the surface of the glass. So perfect are the results and so easy of execution that we doubt not this process will in time supersede all others for the production of mirrors. We shall have to wait patiently until aldehyde becomes cheap; but, like all such products, the demand stimulates and cheapens the supply.

It will be observed, we have stated, that heat is requisite to bring about the reduction—in fact, the chemical change did not take place until the solution arrived at that temperature where aldehyde can no longer exist in the presence of an oxygen compound; therefore we could hardly expect that aldehyde would develope a picture by itself. Such was found to be the case. We have numbered such of the experiments as were of interest, and now detail them:—

1. A moderately-weak solution of aldehyde was poured over an ordinary collodion negative. There was no result, and when aldehyde itself was used the film dissolved.

2. A plain developer made with protosulphate of iron and a little acetic acid was formed, and to a portion of this developer a drop of aldehyde was added. A marked increase was manifested in the quickness of the development; therefore it was evident that aldehyde is an accelerator. But as there is one very serious objection to its use it is not likely to be introduced for this purpose. Its action upon the operator's throat and head is most unpleasant, and if from no other cause this fact would be a prohibition. Aldehyde-ammonia does not, however, present this disadvantage. It is produced in fine large crystals which, when dissolved in water, give very little odour. The slight odour it possesses reminds one of ammonia and turpentine. The crystals are very friable, and something like sugar in appearance. It is very soluble in water, fairly soluble in alcohol, and rather insoluble in ether. The following were some of the experiments performed with the aldehyde-ammonia:—

3. A solution of aldehyde-ammonia was poured over a negative which had received the usual exposure, but an intense fogging immediately took place.

4. As this proceeded from the trace of free ammonia present in the aldehyde compound, two drops of acetic acid were used. This solution, however, like the aldehyde, did not develope.

5. In this experiment the mode of proceeding was exactly as in the previous one, only that the developer was poured over the plate warm. Now, this experiment was suggested from the fact that in the reduction of a silver salt by aldehyde-ammonia, as performed in the test tube, or in the reaction of aldehyde upon ammonio-nitrate of silver, decomposition only sets in at a very considerable elevation of temperature. We indeed know that there is not a developer used which is not in a degree sensitive to the influence of temperature, and it was just possible that the bromide and iodide of silver might be influenced in a similar manner, but the result proved that such was not the case.

6. In this experiment an ordinary plain iron with acetic acid developer was made of ten grains of sulphate of iron to the ounce. Two plates were prepared and submitted as far as practicable to the same exposure. One of these plates was developed with the iron developer in the ordinary way. The second plate was developed by using a mixture of the iron developer with its bulk of water and one drachm of a solution of aldehyde-ammonia (five grains to the ounce). The result was most striking. There was no mistaking the reducing power of such a mixture as compared with the iron alone. Although it only contained about one-half the amount of iron salt, the picture was much more intense and generally more fully brought out in its details.

To sum up the results of this rather extended article upon aldehyde: it is evident that this substance will not act as a reducer by itself. In other words, that the temperature necessary to effect a reduction of the sensitive film is much above that used in the ordinary process of the manipulator; but that when once induced or started by an ordinary reducer, such as iron, it is carried on with avidity by the organic body. Whether this reaction will be made available can only be confirmed by more general experiments.

The few members who were present on Tuesday last at the meeting of the London Photographic Society had then an opportunity of examining a number of negatives produced by the gelatino-emulsion process. Two papers on that process were read—one being by Mr. Joshua King, a correspondent of this Journal; the other by Mr. Kennett, whose name as a manufacturer of sensitive desiccated "pellicle" is well known. Each gentleman is the representative of a specific system of preparing gelatine plates, the nature of which will be understood when we state that success depends upon leaving nothing in the gelatine but the bromide of silver. Now as this bromide is formed by the admixture, *in the gelatine*, of nitrate of silver and bromide of potassium, it follows that while the desired bromide of silver is formed on the one hand nitrate of potash is also formed on the other. This latter salt crystallises out and disintegrates the film, preventing an even, homogeneous picture from being obtained when the gelatine is too rich in chemicals; hence the desirability of removing everything not really useful. To Mr. King is due the credit of applying the beautiful principle of dialysis to the elimination of the crystallisable salt, full particulars of which were given in our last ALMANAC; while to Mr. Kennett must be awarded the merit of being the institutor of the method of drying, as a pellicle, gelatine which has been washed in cold water to remove the soluble salt (of course after it has been sensitised and allowed to set), and in this way to present it to the public ready for use at all times after it has been liquefied by the addition of water. This statement of the relative differences between the methods referred to will enable our readers the better to understand the two papers, which we hope to publish next week.

OLEATE OF SILVER IN EMULSIONS.

AFTER sending you the result of my experiments with Mr. W. B. Bolton's emulsion pellicle in April last, it occurred to me that the formation of oleate of silver in the emulsion before washing and drying into pellicle would be of great assistance in obtaining density in the negative, and for the following reasons:—

Firstly: Oleate of silver gives very vigorous results when used in certain printing processes.

Secondly: Though soluble in ether and alcohol it is insoluble in water, and therefore its effect would not be lost in the subsequent washings.

Thirdly: Being sensitive to light and not decomposed by moderate heat (such as would be used for drying the pellicle or plates), it would neither impair the sensitiveness of, or otherwise prove injurious to, the film on the finished plates, but rather give a greater amount of sensitiveness.

I carried out my idea as follows:—To four ounces of chloro-bromised collodion, I added half-a-drachm of a saturated alcoholic solution of soft soap. This caused a slight turbidity. Immediately after this addition I sensitised the collodion with sufficient nitrate of silver to give five grains thereof in excess of the bromides and chlorides per ounce of collodion, shook well, and allowed the emulsion to stand for twenty-four hours, with an occasional shake. After standing the above time, I added enough of a thirty-two grain alcoholic solution of anhydrous bromide of cadmium to give an excess of one grain or a little more of bromide per ounce of emulsion, shook well, let stand for an hour or so, again shook up, filtered through sponge, added one drachm of glycerine, and poured out to set. After setting twenty-four hours I cut and washed the film thoroughly as described in my last, and dried by moderate heat in a drying-box.

To the resulting pellicle I added equal quantities of ether, s. g. ·725, and alcohol, s. g. ·805, in the proportion of one ounce of the mixed solvents to eighteen grains of pellicle; and, when the emulsion was perfectly formed, added to each ounce ten minims of a forty-eight-grain alcoholic solution of gallic acid, coated, and dried some plates.

After exposure I developed them with Colonel Stuart Wortley's strong alkaline developer (with the carbonate of ammonia), and the results quite came up to my expectation, giving full printing density with the alkaline developer alone, and that without the necessity of using fresh developer after the detail was out. I expected an increase of sensitiveness from the use of the oleate of silver, and was not disappointed in this respect; the increase of density, however, was principally what I worked for and obtained.

I send you for inspection one or two negatives taken with a whole-plate rapid rectilinear lens, No. 3 stop, exposed fifteen seconds, thirty-five seconds, and sixty seconds respectively, in fair sunlight. The plates had an edging of india-rubber, no backing, and the films adhered well during development, fixing, and washing.

The gallic acid solution was added to the emulsion of which these plates were made a week before their preparation, which goes far to show that it does not soon deteriorate. JOHN B. C. FOX.

P.S.—My collodion contained bromide and chloride equal to eleven grains of nitrate of silver.—J. B. C. F.

[The negatives which accompanied Captain Fox's communication show in a remarkable manner the very great elasticity of the process in respect of exposure, for that which received only fifteen seconds is fully exposed, and is a very fine negative; while that which received sixty seconds does not present indications of being overdone. These negatives can be seen at our office during the next few days. —EDS.]

A FEW WORDS ON THE BEER AND ALBUMEN DRY PROCESS.

[A communication to the Edinburgh Photographic Society.]

LOOKING over the pages of the *Photographic News Year-Book* for 1874, an article by Capt. Abney, R.E., page 32, entitled *An Albumen-Beer Process*, attracted my attention from the fact of yourselves and the journals having christened a similar process by my name. The gallant and scientific Captain seems to have been unaware of the fact that my first experiments in this process must date back ten or twelve years, and that after it had been practised by a number of our members and found to be good, Dr. Nicol brought it formally before this Society, in a paper published in THE BRITISH JOURNAL OF PHOTOGRAPHY, July 26, 1867, and thereafter described improvements on it in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1868.

A curious coincidence took place with the publication of that paper, as with many other new discoveries, improvements, and adaptations. The same journal (BRITISH JOURNAL OF PHOTOGRAPHY) which contained the paper read before this Society contained also a note by the Editors stating that a Mr. Murdoch (I think such was the name) had forwarded for publication a process so similar that they might be called identical. Some of us thought this gentleman to be a mythical personage* invented by some sportive correspondent; but, whether so or not, we have heard no more of him, and the albumen-beer process has by general consent been called "Davies's dry process."

As practised by Captain Abney, however, the details of the process are somewhat different, and, I think, somewhat more complicated. I have gone over Captain Abney's modified process very carefully to ascertain whether I could improve on my own system, and so be able to assist those of my fellow-workers who use this process regularly. I am constrained to say, however, that in my hands it does not come up in all respects to the old standard, although giving very good results—better by far, and surer, than many of the more vaunted dry processes. It is a peculiarity of every process into which albumen is introduced that it invariably improves the ordinary collodion negative.

Since the last publication of any words of mine on this process I have made a number of little improvements, which in working may be worth formulising and placing alongside Captain Abney's method, so that anyone wishing to practise a really serviceable and reliable dry process may have no difficulty in working one which has sufficient variability and elasticity to allow of such differences of detail as one ounce of albumen or the white of one egg to ten ounces of ale, as I use, up to the whites of four eggs or four ounces to half-a-glass or five ounces of beer, as Captain Abney uses; and in working the process all that is necessary to be insisted upon is that a thoroughly porous collodion alone be used in this as in other dry processes, without which not one of them can be successful.

I will now quote shortly from the *News Almanac* the gallant Captain's method. After giving instructions as to sensitising, he says:—

"Immerse in a bath of distilled water till all the greasiness disappears, and then wash for a minute or two under the tap. If distilled water be not at hand, use ordinary water (rendered slightly alkaline by potash, if iron be suspected as an impurity) which has previously been boiled and filtered through charcoal; boil and filter through charcoal. If alkaline, add a drop or two of nitric acid, and use this for the first washing. Next you must have a glass of beer divided in two parts. To one must have been added one grain of pyrogallic acid to each ounce; the other must be plain. The white of four eggs should have been beaten up carefully, and to each white one fluid drachm of ammonia should have been first added. This is filtered through muslin, and placed in a bottle alongside the two beers. To a half-ounce of the plain beer half-an-ounce of the albumen must be added in a small glass, and the two mixed together with a rod. This is flowed on the plate, and allowed to rest on it half-a-minute. The mixture is then thrown away, and the plate thoroughly washed under the tap. A final wash of the beer containing the plain pyro. is given, and the plate is then set up to dry spontaneously."

I now proceed to describe my own method in detail, but as shortly as possible consistently with stating clearly what is necessary:—1. Albumenise the plate. 2. Collodionise. 3. Bathe it in the usual way as for any wet or dry process, then wash it under a tap or in a dipping-bath till greasiness disappears. Do not wash too thoroughly, as that tends to make the plate insensitive. If not washed enough it turns brown—decomposes, in fact.

The Preservative.—After draining, the following preservative is used:—Strong sweet ale, ten ounces, or one-half of an imperial pint, to which add from five to ten grains of nitrate of silver dissolved in a few drops of water, or use an equivalent quantity of the bath you are employing. Stir with a glass rod, and allow it to settle; after which filter. More or less silver must be used as you find more or less chlorides in the beer, but always leaving a

* Not so. Mr. Murdoch, formerly of Dundee and now of London, gave up all claims to the process, being satisfied that he had been forestalled. He was, however, an inventor, although not the *first* inventor.—EDS.

surplus of free silver, and shaking occasionally till the beer has taken up as much as possible of the silver, and, if necessary, filter. Then, having taken the white of one egg (one ounce of albumen) and twenty grains of gallic acid, add these to the beer in a forty-ounce bottle with a few pieces of broken glass at the bottom to assist in mechanically mixing the ingredients. Shake rapidly and thoroughly for a few minutes, then allow the whole to settle, and either decant or filter as may be convenient.

To Apply the Preservative.—After washing and draining run a small quantity over the plate, allow it to run off, drain it for a few seconds, run over a fresh lot (which will do for first coating the next plate), drain, and set up to dry. The more rapidly the plates are dried the better they are.

Development.—It is, I believe, in the development where there is any difference in many of the various methods of dry-plate work; and it is here I think my present mode is superior to that of Captain Abney. It is as nearly as may be my first published method:—First, wet the plate all over; then, if there be any doubt as to over-exposure, use a plain solution of pyro. of any strength from three to twenty grains per ounce of water. This may be left in a flat bath without examination for any time up to some hours. If fully out, wash and intensify as usual; if not, return to plain pyro. for a longer time. But this is seldom needed, the alkaline mode of development answering admirably for this method, in using which I take the above plain pyro. and, if the image do not begin to appear within half-a-minute, I add to it a few drops of a twelve-drop solution of *ammonia fortis* to one ounce of water, and so go on adding till I arrive at the proper strength. No bromide of potassium is required, as the preservative itself is gradually washed into, and mixing with the alkaline developer acts as a restrainer of the more active ammonia.

Were it for nothing else but this one improvement I would hold the beer and albumen *preservative* as the best of all the numerous family of that name, inasmuch as whatever simplifies a process without sacrificing any other essential makes it at once more certain and more desirable. Now this simplifies the method of alkaline development, and makes it as easy as the ordinary acid mode—a claim I have not seen made for any other preservative or method whatever.

Another advantage is the power a few drops of the preservative gives of restraining the energy of the developer, whether that result from too much pyrogallic acid, too much ammonia, or too much exposure; and so by judiciously arranging the developer to the exposure of the negative securing a perfect picture, whether the plate may have had much or little exposure. After all, exposure is merely a comparative thing. A momentary impact of actinic force is quite enough if we can only hit on the developer by which that can be continued, intensified, and developed.

The same preservative may be used with bromide emulsion plates and with the purely bromised collodion bath plates. With these it is in no respect inferior in most qualities to any other, and it possesses, in addition, the advantages I have claimed for it. If additional rapidity be needed it is conferred by increasing the proportions of free silver and of gallic or pyrogallic acids, and cautiously reducing the strength of the beer-albumen with distilled water.

I may here mention that I use the gallic and pyrogallic acids indiscriminately. If one be not at hand I use the other. This must be borne in mind—the more rapid the prepared plates are the more perfectly should they be shielded from the atmosphere, and the shorter time they should be kept between preparation and exposure.

Captain Abney mentions two months as the time during which he has found the plates to keep well. I have repeatedly used plates eighteen months' old and found them quite perfect; and tonight I lay before you a negative made from a plate prepared a year ago for Mr. Dallas, which you will see is quite perfect.

I should like to mention a single fact as to the keeping after exposure. I find the plates to keep well for two or three weeks, but after that time the image seems gradually to become weaker, and, after six weeks or two months, the image that remains is a mere phantom, incapable of being strengthened. My advice, therefore, with respect to these plates is to develope them as soon after exposure as possible, and in the interval between exposure and development keep them free from dust and in a perfectly dry place.

And now a last word. To those who have not yet determined on a suitable dry process, and to those dissatisfied with the one they are at present using, I say, unhesitatingly, try this process and you will obtain first-rate plates—equal in most, and superior in some, respects to wet plates; and, as the proper methods of manipulation are mastered, you can calculate with absolute certainty on securing first-rate negatives. W. H. Davies.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

Spirit photography of a certain kind is in the ascendant just at present. Since the appearance of an editorial article in your last volume, in which was described the grasping by fleshly arms and unmasking of a spirit in one case, and in another the failure of the spirit to appear when the medium had been properly tied by editorial fingers, many queer events have taken place. There are two young lady mediums under or in connection with whose mediumistic powers spirits come out, show themselves, and walk about. But, alas! one of them was lately caught and held fast by Mr. Volckmann—a gentleman of great mental attainments, who thus became aware of the fact that the "ghost" was the medium herself! In the other case a sister of Sergeant Cox, in the house of that gentleman, similarly clasped and unmasked the spirit with precisely the same result. Mr. William Crookes, F.R.S. has, however, during the past week, published far and wide his entire belief in the honesty and integrity of the former of these media, and wishes it to be known that not only has the spirit, *not the medium*, submitted herself to what may be termed a personal examination, including the use of the stethoscope—proving to his satisfaction the fact of complete "materialisation," the medium being seen at the same time—but the aërial visitor has time after time submitted herself so patiently to Mr. Crookes's camera as to have enabled him to secure forty-four negatives by the magnesium light. For this statement and a good many more Mr. Crookes is responsible. It is fair, however, to say that his *dictum* is not received everywhere with a due amount of faith; but, on the contrary, that some surmises have been ventured respecting the part which may have been taken in some of these ghostly visitations by a servant girl. Surely a cool investigator like Mr. Crookes would not allow himself to be fooled by a servant girl. The subject will, I imagine, be brought under the notice of the Royal Society.

I have enjoyed Mr. Neilson's capital paper very much. It really smacks of fresh air and heathery hills. This brings to my mind an incident narrated by a Cockney friend of mine who has just returned from a tour in Scotland, and from whom I learn that there is at least one magnificent mountain in that country. He had seen and ascended *Ben Nevis*, and, with a view to give me an adequate impression of its grandeur and altitude, "Lor' bless you," said he, "Primrose Hill wont bear comparison with it; it's far higher!" The said Primrose Hill, it may be well to inform provincial readers who seldom visit the metropolis, is a tiny elevation in the north-west district of London, at the top of which nursemaids and their charges—the latter brought in perambulators—bask in the sun. I have seen photographs of Scottish scenery, and I think my friend is right; some of the hills in the north *are* higher than Primrose Hill, and even Holborn and Highgate hills to boot.

The claim you make on behalf of the Silber lamp is wise; that is to say, you claim nothing for it but good making and fitting. But passing the question whether these form the material for a patent worth sixty thousand pounds—the sum Mr. Silber obtained for his patent—I observe that unwise special claims were made for it by the lecturer at the Polytechnic Institution last winter. The two chief of these claims were comprised in a central air-tube passing right through to the foot of the lamp, and an aperture in the side through which to pour in the oil. Two worse features could scarcely have been selected; for not only have thousands of argand lamps had these peculiarities for many years, but a great number of the Silber lamps have *not* got them. A late American humourist says that a horse is the "onliest thing" in creation that will bear much praising, and there is no lamp yet in existence that will stand very much of it; but that Silber's lamp is really a good one I unhesitatingly admit.

I have had an opportunity of putting cyanide of potassium to a use not contemplated by dealers in photographic and electro-metallurgical appliances. A favourite rose-tree which, through the ravages of green fly and blight of some peculiar and to me unknown kind, had been brought to the lowest point of existence, was marked for destruction at no distant period. It occurred to me to try the effect of a strong wash of cyanide to its sickly and offensive-looking boughs, knowing that it would at the very worst only hasten its demise. Accordingly every portion was soused thoroughly with a strong solution—probably about a twenty-grain one or thereabouts, for I did not weigh the material—and after being allowed to remain on for about an hour was washed off. All animal life, I need

* Concluded from page 26

scarcely observe, became extinct. Next morning the tree appeared fresher; in four days it looked beautiful; and at present, within a fortnight of the cyanidising, it is covered with very charming roses. On one branch, carefully marked, I allowed the cyanide to remain without washing. In three days it was destroyed.

As so much is at the present moment being said about what has been termed the "dusting-on" process, it may be worth while for me to make a note of the fact that it was publicly described in a lecture, before the Society of Arts, by Mr. F. Joubert, on May 22, 1861. The following was the sensitive mixture then recommended by him:—

Saturated solution of bichromate of ammonia...	5 parts.
Honey...	3 ,,
Albumen...	3 ,,
Distilled water ...	20 to 30 ,,

Mix well together, and filter before using. We have not advanced *very* far in this direction since the above formula was published thirteen years ago.

ALBUMENISED PAPER ENLARGEMENTS BY DEVELOPMENT.

At a recent meeting of the Vienna Photographic Society Herr Carl Matzner gave some particulars by which he effects enlargements by development on albumenised paper. We have pleasure in giving an account of his formulæ.

He prepares first a bath of one part of silver to eight parts of water, and after the crystals have been fully dissolved adds a tenth part of a dilute solution of citric acid, stirring or shaking the mixture the while. Good and, when possible, strong albumenised paper is then chosen and plunged into the bath, so that the back equally with the front may be coated by the solution. After three minutes' immersion the sheet is hung up in a room totally dark, and allowed to dry slowly. This paper must be kept from the daylight much more carefully than ordinary silvered paper. It may be prepared one or two days before using; for, on account of the acid, it will remain eight days or more quite white.

We now come to the impression:—This may be taken either in the printing-frame or in the solar camera through an enlargement. A fourth or fifth of an ordinary exposure is given, and when there is just a faint image visible the sheet is removed to the dark room, there to be further dealt with.

The development may be either proceeded with at once or left till another day. Should the sheet be covered, without preparation, with acidulated pyrogallic acid the whites would come out first a yellow and then a brownish hue; and, to guard against this evil, Herr Matzner has recourse to the following plan:—The sheet is laid first in a clean tray, which is a little larger than the sheet, care being taken that the room is well darkened, and then distilled water is poured over it, so that both sides of the sheet are covered with it, but not much more. When this is accomplished—and it will be an advantage if a few drops of silver solution be added to the water in the dish—the tray is raised at one end so that the water may run to the lower corner, and, when it is a whole sheet that is operated upon, one and a-half ounce of glacial acetic acid is then poured over its surface. This, mixed with the water, is now agitated backwards and forwards over and under the sheet for about five minutes until the paper becomes quite soaked. After this preliminary the actual development is proceeded with.

Through the action of the acid the albumenised paper has become transparent, and the greatest difficulty of all—the difficulty of the penetrating of the pyrogallic acid through the paper—is now much lightened. Concentrated pyrogallic acid, acidified with glacial acetic acid, is now poured over the sheet, and the tray moved slowly as before. The image will come up slowly, and in about half-an-hour's time will be quite strongly out with good, strong shadows, unless the temperature be very low. Should the image not thus attain the desired intensity it may be strengthened by using a few drops of the silver solution above given, and proceeding in the ordinary way. When it is sufficiently developed it must be thoroughly washed to clear it from the free chloride and the acid, and, with a final rinse in distilled water, may then be subjected to toning.

Almost any toning bath will do, provided it be but half the ordinary strength. The water is poured all away from the print in the tray, and rapidly replaced by weak toning bath. So soon as there is any sign of a change of colour the sheet should be taken out, washed, and placed in the hypo. bath for fixing. This fixing must be carefully done, seeing the manner in which the sheet has been silvered; and when accomplished the subsequent washing should demand equal care, although there is nothing otherwise special in the treatment of the print subsequent to toning.

In order to heighten the beauty of the tones a small quantity of a gold solution is added to the fixing bath the day before it is used, the soda being stirred rapidly all the time. The strength of the bath is one part of hyposulphite to twelve parts of water.

The process is a rather expensive one, except for these important kinds of picture, and the fixing bath demands, to begin with, at least a considerable quantity of gold; but it may be used repeatedly, Herr Matzner thinks, without evil effects.

MONTHLY SPIRIT OF THE JOURNALS.

[A communication to the Edinburgh Photographic Society.]

When I undertook to bring together as an experiment, and at the request of the committee, the *Monthly Spirit of the Journals*, I little thought of the trouble it would involve; and I can only hope that the next volunteer who takes it up may be able to give you at once a more practical and a more useful digest than I have done. I have necessarily overlooked many of the points deserving notice; and, in condensing these extracts, I have been unable, mainly through want of time, to connect them as I would have desired. So the will must be taken for the deed.

Aniline colours have been again recommended for the purpose of tinting photographs and photographic paper. I do not seriously object to their use, but remind those who wish to try them that when used as pigments on silver prints they are the most unstable of all colours, as the folios of many a dealer in coloured photographs could show.

Mr. M. Carey Lea wishes to know what will remove the stains of alkaline pyrogallic acid development from the fingers. I think, if he tries, he will find that tartaric acid with warm water, freely applied with a brush, will overcome his difficulty, followed with sand soap, or, still better, pumice and rubber sponge.

The mnlancholy position into which the London Photographic Society has drifted, and the quantity of leading articles and correspondence on the subject, induces me to suggest that if the Parent Society would adopt the rule existing in our Society—namely, of one-third of the council retiring annually, such retiring members being incapable of re-election for a year—their greatest difficulty would be overcome. A good addition to this would be a reduction of the number of the vice-presidents, and their removal by seniority in the same way. Whether a limitation of time should be applied to the holder of the president's chair is a more delicate question; but our rule of annual election, with the power of re-election, is a sound and a healthy one, and one which would obviate every difficulty. Of course, in a national society proxies must be allowed, even though they are often abused.

Mr. Gordon Ramsay suggests the use of three small rings of rubber on the triangular top of the stand, to save scratching the bottom of the camera. I would like to ask him to fit these to the more usual circular tripod head, and he would find it difficult. These loose rings he would also find a nuisance if he lost, broke, or forgot one of them. Let him try my plan—as shown to this Society three or four years ago—of getting a groove cut or cast in the solid iron or brass of the top, and inserting therein a strip of vulcanised rubber projecting slightly from the surface all round. He would then find that not only will he have secured his darling camera from scratching, but he would also find that the adhesiveness of the rubber makes his camera a great deal firmer and more rigid.

At a meeting of the Photographic Society of France, on April 10th, M. Rennaud, member of the French Aeronautic Society, begged the former society to photograph a bird in the act of flight. The chairman said the thing was impossible; nothing but a blur could be got, which would teach nothing. Still, however, the society could try the experiment, and he himself meant to try. Do so, M. Ferrier, and if you are as successful as our townsman, Mr. John Lennie, you will have nothing to regret. His stereograph of the seashore, with a flying gull, was simply perfect. It was taken fully ten years ago.

A claim has been made by that careful experimentalist, Mr. M. Carey Lea, for an improvement in the collodio-bromide plates by the omission of washing and the introduction of albumen into the preservative, so forming an albuminate of silver in the film. Apart from chemical reasons which have been dealt with by the Editors of The British Journal of Photography, there are other good reasons why washing may be dispensed with, and albuminate of silver formed in the films. Assume an accurately-balanced bromide emulsion without excess of nitrate, and all that is wanted to make the preservative flow easily is one of two things—either such a partial evaporation of the solvents of the collodion before dipping in the preservative bath as would allow easy covering and penetration by it of the film without decomposition, which I think may be easily managed; or adding, as I have done, spirits of wine to the beer and albumen preservative, or any other containing albumen, sufficient to allow the preservative and collodion to attach themselves to each other, and the thing is done. All that is wanted is to give time between preparing the plate and preserving it. With such a preservative, which is of the nature of a varnish, it is well to use a little spirits in the developer to allow of more perfect penetration by the developing agents. What our Editors say as to the throwing down of the albumen, &c., seems to me of little consequence, as I know by many experiments that a small quantity of albumen may remain in solution in presence of alcohol and sulphuric ether, and a very minute quantity is sufficient for the purpose; indeed, it is possible to combine collodion directly with albumen, all that is necessary being the exposure of a large surface of albumen (say in thin scales) to a rather aqueous sample of collodion, combined with gentle heat and agitation. Collodion so treated requires no preservative, the washing of the plate being sufficient; and the best proof that the albumen has entered into combination is the character of two plates taken from the collodion so treated and not so treated. Albumen, in whatever form applied, invariably improves the character of the collodion image; and I feel perfectly certain that I will be borne out in saying that in every case the albumenous class of preservative gives the best quality of negative. Many other reasons might be adduced. Reasons, however, are not wanted, but experiments are; and I only give them because they have not yet been adduced. The general question of the formation of an albuminate of silver in the film seems to me to be not only an easy one to solve, but one that has been solved over and over again in all the albumenous dry processes.

The introduction of Ross's new symmetrical lenses calls for a word of notice. Has anyone seen or got one of them? According to the description given of them they are made on the Steinheil model, but corrected for colour. One cannot be always buying new lenses, some of which, after all, sometimes turn out no better than the older ones. My impression of these, from a cursory examination of one of them, is that the principle is good, and that they ought to supply a felt want. If they give, as stated, finer definition than the doublet of 1864, they will be good indeed; for one of my finest lenses is of that make, and I have not met its match in any other lens for that particular quality.

Weston's rotary burnisher has been mentioned, and I bring a few prints to show the action of the instrument. I may mention that I think it frightfully dear. The burnisher itself seems to be made from chilled cast iron. It is said to be an alloy—not steel; and it looks more like cast iron than anything else I know. The prints must be finished in the touching before being burnished, otherwise the touching shows very badly. The slightest speck of dust, also, is fatal to the effect.

The blacklead dusting-on process has apparently met with much favour. Have any of our ardent experimentalists tried it yet? It is so fully described that there need be no difficulty. I should, in the Society's interest, like to hear the results.

Matzner's developing process for albumenised prints was read before the Vienna Photographic Society. This process, shortly stated, consists of silvering the paper by immersion in a silver bath which has been acidified with citric acid at ten per cent., printing till the image is faintly visible, developing, or rather strengthening, by saturation with distilled water, face downwards, adding a lot of glacial acetic acid, and, when quite wet, a saturated solution of gallic acid, with, if necessary, a few drops of solution of silver. Surely this is not such a discovery as to deserve the reward the discoverer (save the mark!) wished the society to present him with for doing them the honour of publishing it.

Coagulation of albumen on paper has, according to the agreeable French correspondent of the *News* (M. Lacan) been occupying the minds of some of our French *confrères*, and he chronicles the fact that M. Thierere *fils*, of Bresles, had succeeded in doing this by the addition of alcohol to the bath—no new addition, one would say. But M. Lacan should know that this is a perfectly easy thing to do, and that it is done to a certain extent commercially. I brought before this Society, a number of years ago, the method invented by Mr. Wood, of this city, viz., acting on the paper with steam in a closed chamber, varying times being used according as the albumen is wished to be more or less completely coagulated. I have made the albumenised surface so hard by this process that the paper became quite waterproof, and in this state have found it almost impossible to get the silver to attach itself to the albumen. Some mechanical uses might be found for such paper, say for waterproofing insides of dishes, &c. Photographic use it has none, but where the coagulation is made less perfect the surface is improved, the bath does not become discoloured, and the paper is in every way improved; it also keeps better. The paper, however, is slower to tone. The ordinary double albumenised paper of commerce is prepared in this way for the first coating, the second being done in the ordinary way by flotation, or sometimes by brushing on very carefully to avoid bubbles, and in this way a very brilliant surface is produced.

Such are a few of the items noticeable in the month's journals which I have thought worthy of comment or discussion this evening, in order that they may be tried and, if found right, accepted; or, if wrong, sent to the limbo of forgetfulness.

W. H. Davies.

Our Editorial Table.

The Amateur's Photographic Guide Book.

By W. J. Stillman.

London: C. D. Smith and Co., Fleet-street.

That Mr. Stillman possesses an immense fund of practical photographic knowledge it would be quite superfluous on our part to inform our readers, who are aware of the numerous practical hints—hints derived from actual experiment—which he has from time to time contributed to photographic serial literature. Few, if any, who have so distinguished themselves have failed to provoke the wish that they would collate such varied experiences, and present them for reference and guidance in a *multum-in-parvo* form—in a shape in which the pith of the knowledge so laboriously acquired should be given shorn of the unnecessary ornature with which it is sometimes overlaid when published in the journals. This is just what Mr. Stillman has done in his *Guide Book*, which, as stated on its title-page, is "a complete *résumé* of the most useful dry and wet collodion processes." The manual is dedicated to the members of the Amateur Field Club, with which body the author is connected.

Speaking of amateurs, we are glad to find that Mr. Stillman does ample justice to those of our own country by stating that the number of skilful amateurs here is very considerable, the work exhibited by some of them being "literally the very best of its kind the world can show;" and he only states what every one acquainted with the rise and progress of our art-science will endorse when he says that "the investigations and elaborate scientific experiments which some of them have undertaken and carried through have so completely explored the ground, and so largely aided to establish its practice, that, more than any other study allied to science, it may be called the result of amateur investigation. Even of those who have become professional photographers, so many were amateurs drawn into it from pure love of it, fascinated by the artistic charm inherent in it, and drawn to a more devoted allegiance to Nature by the closer insight it has given into her traits, that, while it will scarcely be admitted by general consent to a position among the fine arts, we find it impossible to deny the title of artist to some of them, or of an essentially artistic character to the occupation—so many opportunities does it offer for the display of the artistic instincts and perceptions."

Speaking from an intimate personal knowledge of Mr. Stillman, we are scarcely in a position to say whether he is most at home in treating of the æsthetics, the mechanics, the chemistry, the philosophy, or the manipulations of photography; for he is thoroughly *au fait* in all these departments, and manages to find time to prosecute researches in each, notwithstanding the persistent whirls of the politico-literary life in which he is professionally engaged.

Passing over the principal text of the manual, in which directions for taking negatives are given under the elastic assumptions that commercial dry plates are to be used, or that the wet collodion process is to be practised, and passing further equally minute instructions for obtaining prints from negatives, we arrive at the Appendix, which reminds us very much of what is said respecting the postscript to a lady's letter, namely, that in it matters of paramount importance are sure to be found. Mr. Stillman's Appendix, which is arranged under five distinct headings, will be found to contain ample stores of information exceedingly useful, conveyed in the form of hints on baths and bath solutions; filtration and pinholes; dry processes—including those of Major Russell, Mr. Gordon, Dr. Taupenôt, Mr. M. Carey Lea, and of Mr. Stillman himself; developers, both acid and alkaline, both weak and strong; photographing in the field and in tropical regions; concluding with hints concerning lenses.

Being well aware that Mr. Stillman had "worked out" a modification of a previously-existing emulsion process—which modification, as we knew from experience, gives good results—we lost no time in searching through the pages of the *Guide Book* for his *excerpta* on this interesting subject, and found it in the Appendix. We conclude by giving an abstract of the process. The pyroxyline is made from—

"*Papier Joseph* .... 100 grains.
Sulphuric acid (1·840) .... 6 ounces.
Nitric acid (1·450) .... 3 "
Water .... 1 oz. 3 drachms.
Temperature 140°. Immersion, twenty minutes.

"Make the plain collodion as follows:—
Pyroxyline .... 100 grains.
Alcohol (·825)................................... 5 ounces.
Ether, rect... 2½ "
Nitrate of silver (finely pulverised).......... 80 grains.

Agitate and keep warm till the whole of the nitrate has dissolved, when allow to depose. After two weeks draw off, and sensitise by adding to each three ounces one ounce of ether and thirty-two grains of bromide of ammonium pulverised as finely as possible, and when this has had time to dissolve completely—say after six hours, with occasional agitation—add twenty grains of nitrate of silver. Agitate occasionally for several hours; add to it five minims per ounce of an alcoholic solution of gum ammoniac. To prepare this pulverise the gum, and on one ounce of the powder pour two ounces of absolute alcohol, and agitate for a few minutes, two or three times, and then leave to depose, when pour off the clear portion for use. It will require several days to depose. I have kept this emulsion for six months without any change being perceptible."

No advanced worker in photography can afford to be without such an excellent little manual as that of Mr. Stillman.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 17........	Bristol and Clifton Amateur ..	Philosophical Institution, Clifton.

LONDON PHOTOGRAPHIC SOCIETY.

The last ordinary meeting of this Society for the present session was held on Tuesday evening last, the 9th inst.,—Mr. J. Spiller, F.C.S., President, occupying the chair.

The minutes of the previous meeting having been read, and Mr. Richard J. Friswell, F.C.S., admitted a member,

Mr. J. H. Dallmeyer made a communication on behalf of Dr. Monckhoven, the result of which was a proof, by spectroscopic analysis, that Dr. Vogel was mistaken in asserting that by such applications as those of coralline or analogous colouring matters to the film any increase of sensitiveness could be obtained for red and yellow rays. This afforded another proof, in addition to that recently given by Mr. Spiller and Mr. Stillman, that Mr. M. Carey Lea was right in the adverse position he took up respecting this hypothesis. We hope to be able to publish Dr. Monckhoven's paper in our next issue.

Captain Abney, who had tried several experiments, was quite of the same opinion as Dr. Monckhoven and the other gentlemen.

Thanks were awarded to the author of the paper, and also to Mr. Dallmeyer for his explanations.

The next business was the reading of a paper on *Gelatine as a Vehicle for Soluble Salts in the Production of Negatives*, by Mr. J. King, an abstract of which was given by the President; which paper in turn was followed by one entitled *A Few Notes on Alkaline Development*, by Colonel Stuart Wortley. This paper, by permission of the author, and like the two which had just preceded it, was taken as read, and thanks awarded. Two negatives, illustrative of the points in the paper, were exhibited; on these we shall have some remarks when we publish the paper itself, which we expect to obtain for our next number.

The fourth paper was by Mr. R. Kennett, *On the Gelatino-Bromide Process and the Preparation of a Dry Pellicle*. It was read *in extenso*, and will, eventually, be presented to our readers. Several negatives and transparencies were exhibited.

After a few remarks by the Chairman, who proposed the thanks of the meeting to the author,

Mr. Jabez Hughes described some trials he had made with gelatino-pellicle plates within the last few days, the result of them being to establish in his mind the fact that these dry plates were as sensitive as wet collodion plates, their delicacy and perfection being also quite as good.

At the close of the meeting the members examined the gelatine negatives, and also several spectroscopic photographs sent by Dr. Monckhoven in illustration of his paper, a microscope having been provided by Mr. Dallmeyer for this purpose.

The proceedings then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The eighth ordinary meeting of this Society was held at the Bible Society's Rooms, on the evening of Wednesday, the 3rd inst.,—the President, Mr. R. G. Muir, in the chair.

The minutes of the previous meeting were read and approved, and the following gentlemen were admitted ordinary members:—Messrs. John Lessels, Grierson G. Mitchell, and John Murray Gartshore.

The Chairman said that before proceeding to the ordinary business of the evening, he had to intimate the presentation to the Society of two very handsome gifts—an oak bookcase by Mr. Murray Gartshore, and a fine copy of Rejlander's *Two Ways of Life*, by the family of their late fellow-member, Mr. James Wood. Some three weeks ago, on the invitation of Mr. Gartshore, he and the two secretaries had visited Ravelstone, and spent a very pleasant day in examining the house and grounds. As one of the outdoor meetings was intended to be held there, the members would see that it was a perfect mine of photographic wealth. In one of the rooms Mr. Gartshore showed them the bookcase, which, in consequence of alterations, had been removed from the library, and kindly offered it to the Society if it would be of any use to the members. They, of course, gladly accepted the offer, and he might add that, in addition to its intrinsic value, it was said to have the still higher merit of having been designed by Sir Walter Scott.

Mr. W. H. Davies said that no more acceptable gift could have been received, as the members were aware that the committee had been for the past two or three years looking out for a suitable bookcase in which to keep the literary and artistic property of the Society. He moved a very hearty vote of thanks to the liberal donor.

Mr. W. Neilson seconded the motion, and requested the Secretary to convey their thanks to Mr. Gartshore.

Mr. Tunny, in proposing that the thanks of the Society be conveyed to the family of the late Mr. Wood, said that he was glad that the Society now possessed a copy of Rejlander's interesting picture. It was the first and, perhaps, most successful attempt at combination printing, and had excited much interest and discussion at the time of its publication.

Mr. Wanchope seconded the motion.

The Secretary was requested to get it suitably framed with a view to its preservation.

The President then said that the business committee had for some time been anxious that some member should undertake to bring before each meeting a short paper consisting of brief gleanings from the photographic journals, with as brief comments or criticisms—the spirit of the journals, in point of fact; but they had not till now succeeded in inducing any one to undertake the duty. Mr. Davies, however, had consented to make a beginning, and would now read the first paper. [See page 280.]

Mr. Tunny, in reference to Mr. Davies's observations regarding Obernetter's process for the reproduction of negatives, observed that Mr. M. Carey Lea seemed in high dudgeon at Herr Obernetter for claiming to be the originator of the process, and said that it was nothing more than a modification of one previously published by him. If that be so, then most assuredly Mr. Lea could not claim originality in the publication, as his was nothing more than a modification of that published by M. Camarsac, and one patented by M. Joubert at least four years previously. He himself had been working in the same direction as early as 1855, and had got fair results by adding bichromate of potash to a mixture of dextrine and albumen, exposing under a negative or positive, and brushing on the lampblack, or carbon got by holding a piece of glass over a burning candle.

Mr. Davies said that photographic inventors and experimentalists should be diligent readers of the journals, otherwise they would most certainly be constantly getting into hot water. He had no doubt that many unsound claims were made in ignorance of what had been done before, but he was equally sure that many were made in connection with which that charitable supposition would be thrown away. As a case in point, he might mention the manufacturer of, he thought, the only commercial steam congulated albumenised paper, Mr. Skinner, late of Glasgow, but now of London. He had come to Edinburgh, called on him (Mr. Davies), and been introduced to Mr. Wood, the discoverer of the method. From both he got all necessary information, and then went off to the proper office and registered the method, which was, of course, not worth the paper on which it was written, much less the fees which had been paid.

Mr. Pringle said his firm had got one of the nine-inch rotary burnishers, which at first seemed as if it would do, but although he was not yet in a position to altogether condemn it they were not certainly at all pleased with its work. In the first place, they had discovered on the burnisher a scratch so minute that it required the aid of a lens to see it, and yet it made its mark on every print, and the agent through whom it was sent refused to exchange it, on the ground that they were all tried and found right before being sent out. This, of course, would show how much care would be required to prevent a speck of hard dust getting between the print and the burnisher. Then, he thought, the roller was much too small for the size of the plate, and, in consequence, in their hands at least, the polished surface of the print was covered with wavy markings running at angles to the way in which the burnisher had passed over it, as would be seen in the card which he laid on the table. And, lastly: when the light was applied to heat the plate there was a large quantity of condensed moisture formed, which caused considerable delay before getting to work, and which would tend much to oxidise or rust the polished surfaces of the metal.

Mr. TURNBULL had tried one of the burnishers thoroughly, and did not like it. It was more difficult and troublesome to work, and did not produce a better if as good a surface as some of the older presses in the market. The machine was simply cast iron, and the prices charged were ridiculously high.

Mr. TUNNY heartily agreed with all that had been said against the burnisher, and begged to say, in addition, that it pulled the paper in such a way as to produce absurd distortion.

Mr. DAVIES then read a paper entitled *A Few Words on the Beer and Albumen Process* [see page 278], and laid on the table a number of fine negatives to show what the process as worked by him was capable of producing. They were much admired, and several members said that their experience led them to consider Davies's process the best yet introduced.

Dr. THOMPSON said he had wrought Davies's process successfully for a long time, and he had also tried putting the plate direct into the beer preservative with considerable advantage.

Mr. W. NEILSON, in moving a vote of thanks to Mr. Davies, said that he had done the *Spirit of the Journals* so well that he ought to continue it, and he was certain that such monthly papers would elicit much valuable information.

The vote was carried by acclamation.

Two questions from the box—"What are the relative advantages of alkaline and acid pyrogallic development?" and "What is the most likely cause and best remedy for the blistering of albumenised paper?" were deferred till the next meeting.

Correspondence.

THE DUST PROCESS.—DISCOVERIES AND REDISCOVERIES.—EXCESS OF FREE NITRATE IN EMULSIONS.—SIMPLICITY *versus* COMPLICATION IN PROCESSES.—THE LONDON PHOTOGRAPHIC SOCIETY.

THE readers of a photographic journal like the present must be hard to amuse if they are not very often much diverted with its contents. It is funny enough to read of new processes which are turning up from week to week involving the use of admixtures of ingredients which, according to old-fashioned notions of chemistry, ought instantly to come to grief; but it is funnier still to read of the rediscoveries of old processes which are continually being made, and of the facetious claims to priority which are so frequently set up by gentlemen who seem to be amusingly ignorant of the early history of our art.

Concerning the dust process. As I meditated on Mr. M. Carey Lea's claim to the discovery of it certain visions of dust processes which were the discoveries of MM. Salmon and Garnier, M. Joubert, and M. Lafon de Camarsac, years and years before 1865, and an account of some of which the reader will find in my *Dictionary of Photography*, published in 1858, flitted before my memory. Moreover, a distinct recollection cropped up of my having once attended a lecture by M. Joubert, at the Society of Arts, in the spring of 1862, in which he described *his* dust process upon glass, with bichromate and albumen, and exhibited a large number of beautiful specimens taken in that way; in fact, he had patented the process, and all the photographic journals had described it at that date! I remembered, also, and so may many of my readers, a print called a "phototype," done by M. Joubert by his dust process upon paper, and which was presented to the journal of the Photographic Society in the same year, representing a group of Frenchmen reading a bill upon a wall. In short, the dust process is as "old as the hills;" and, if we may believe the very strong assertion once made to me by M. Garnier in a personal interview, *he* was the discoverer of it about the year 1856, and M. Joubert got it from *him*. He even went to London in order to show the latter gentleman how to print his specimens for the journal, and aided him in doing them. In all these matters it is held that priority of publication settles the claim to priority of discovery, and the dust process was certainly employed, published, and even *patented* many years before Mr. Lea so generously gave us his particular version of it; and the process must be regarded as a very old one, and essentially French in its origin.

With respect to emulsions containing a *large* excess of free nitrate, Mr. Lea seems now to have become a convert to this doctrine, whilst Colonel Stuart Wortley has vigorously contended for the principle for years; and also to the admixture of the organifier with the free nitrate. The former gentleman says (page 259):—

"For a collodion containing nine grains of dried cadmium bromide to the ounce there should be twenty-two or twenty-three grains of silver nitrate."

Will he kindly tell me how much water per ounce his collodion emulsion contains? I have never been able to introduce anything at all approaching the above quantity of free nitrate into really good collodion which does not give crapy lines. Nitrate of silver is said to be perfectly insoluble in cold absolute ether and alcohol, whilst collodion will not bear more than twenty minims of water per ounce without giving crapy lines.

It must, I think, strike everyone as odd, on reading the modern methods of collodio-bromide emulsion making, that numerous substances are introduced into the emulsion which are certainly not required in a bromide of silver film which has been excited in a bath. Why is this complication necessary? Why are chlorides, *aqua regia*, uranic salts, free nitrate, &c., &c., necessary in an *emulsion*, whilst a sensitive *bath* film contains nothing but the silver bromide, and no free nitrate, before the application of the organifier? These are questions which require an answer, and they have never received it yet. In the bath process every trace of free nitrate *must* be washed out of the film, otherwise the plate fogs under the action of the developer. Why, then, should free nitrate be present in an emulsion film? Why do not emulsion makers take a lesson from the bath workers, and simplify their process? Why does the emulsion process become more and more complicated every week?

And here are some more questions:—What becomes of the nitrate of cadmium in an *un*washed emulsion film? Is it transferred to the organifying bath? And, if so, what becomes of that bath after a few plates have been immersed in it, particularly if the films contain free nitrate? If a *nitrate* bath is changed in composition by every plate that is excited in it, surely an *organifying* bath for *un*washed plates containing free nitrate must be still *more* changed. What, then, becomes of the special advantage of the emulsion process, which is said to lie in its requiring no bath of constantly-varying composition?

The ever-increasing complications of the emulsion process appear to me to arise from the attempt to combine exalted sensitiveness with full printing density. In a *bath* film this can be done without any aid from free nitrate or albuminate of silver, *because* a bath film is not the same through its entire thickness. It contains more unconverted bromide at the back than the front, so that whilst the front gives sensitiveness the back gives density. But this happy state of things cannot be imitated in an emulsion film, because that *must* be the same throughout its entire thickness.

Colonel Stuart Wortley assures us that he has solved this knotty problem by means of an addition of organic matter to his emulsion; but will he kindly tell us all about this, for there is a *principle* at stake in it.

The emulsion process is an amusing problem for an experimentalist, and there can be no doubt that when plates of *moderate* sensitiveness are required it answers perfectly. With *slow* plates one can get very easily any amount of density without silver intensifying, and these slow emulsion plates are first-rate for copying engravings. But when it is required to prepare emulsion films which shall rival wet collodion in sensitiveness greater difficulties are introduced, and the process becomes coquettish. The negatives are then thin, and difficult to intensify, because there is not enough unconverted bromide of cadmium in the film. Although I have given up the process for my own use, because I can prepare equally good *slow* dry plates in a more sure and simple manner with bromo-iodised collodion, a thirty-five grain bath, and an albumen preservative, yet I feel bound to say that some of the best negatives I have ever taken have been upon Mr. Mawdsley's collodio-bromide plates. I have no pet processes or pet theories, and only advocate what I honestly believe to be the truth. It would afford me quite as much pleasure to find the emulsion process perfected for rapid dry plates as any other in which I may at present have greater faith; and I read all that is published about this process with much interest.

But if the plain truth must be told, I do not always care to repeat the experiments described, for I see no great attraction in an organifying bath composed of "gum and sugar, with albumen and gallic acid," although plates prepared with an emulsion containing twenty-three grains of silver nitrate per ounce immersed therein are said by a high authority to possess "most remarkable properties." Neither do I care to take even a "*slight* amount of extra trouble" by adding to the above emulsion some "cobalt chloride and potassium nitrite, and raising the silver nitrate to twenty-five grains!" Moreover, I leave to more ardent experimentalists to try for themselves the effect of the addition of *tannin* to the above organifying bath, in order that their "further experience may pronounce with certainty" upon the result. It is sufficient for me to read of such experiments as these, and to wonder what will come next!

But we are all made to wonder sometimes, and even our gifted American friend, from whom we have learnt so much, was astonished the other day by what was even to him a new fact in chemistry; for he tells us that "in preparing my albumen bath with gallic and tannic acids I was surprised to find a quantity of flocculent, whitish precipitate formed, which ruined the bath," &c. (page 259). It does not appear, therefore, to be generally known that tannic and gallic acid coagulate albumen. Nor, I believe, is it generally known that albuminate of silver is instantly blackened by contact with an alkaline developer.

In an amusing letter which I received a few weeks ago—at the time of the commencement of the troubles which seem now to have become chronic with the unfortunate Photographic Society—from a gentleman who had been a short time on its Council, he gave it as his opinion, *founded on experience*, that either there should be *no* photographic journalist at all amongst the office-bearers of a photographic society, or there should be *two*, in order that one might be a check upon the other in the accuracy of reports and other ways. He spoke, of course, of the editors of "commercial" journals not officially connected with the Society, and what he suggested seems sensible enough. A society like the London Photographic Society must necessarily include members having conflicting trade interests; it is therefore obvious that no editor of a "commercial" journal should be allowed to have it in his power, by holding office in the Society, to push his own private interests and those of his personal friends at the expense of other members. Although two such journalists, by representing opposite parties, might perhaps hold each other in check, yet it would be better to have none at all, and to consider the profession of journalism as disqualifying a man from holding office. Depend upon it, until this principle is acted on, the London Photographic Society will never prosper or be at peace. There will always be wire-pulling and discord, and many good men will continue to stand aloof from it. I have ventured to make these remarks in the interest of the Society itself and also of the trade.

June 4, 1874. THOMAS SUTTON, B.A.

STAINS AND EXPERIMENTS.

To the EDITORS.

GENTLEMEN,—I have been trying the effect of putting Sutton's bath plates, sensitised in an eighty-grain bath, into an organifier composed of albumen one part, distilled water two parts, and salicine four grains to the ounce. Also, into one made thus:—Into half a pint of strained milk drop fifteen minims of *ammonia fortis*, and allow to stand twelve hours; draw off the caseine and whey by means of a syphon, add four grains to the ounce of salicine, and filter. To each organifier I add one-half of a drop of carbolic acid to the ounce.

In one of these organifiers I place the plate after washing it in one bath only, then rinse, and coat with glycerine and water. The plate looks very well *now*, but, on developing, wavy, unequal stains appear, with here and there, especially near the edges of the plate, small black patches like blots of ink.

Now I want to find out the cause of these stains. Is there free silver in the plate on developing? If so, it would appear to be no easy matter to destroy all trace of nitrate of silver by means of albumen, as I leave the plate three minutes or so in the organifier. It may, perhaps, be a more easy matter for the silver to combine with albumen when the plate is an emulsion (Carey Lea) one, because the silver is then not so much on the surface as in the case of bath plates. I imagine that perhaps the albumen cannot get at the silver through the coating of albuminate on the surface of the plate. If this be not the case, how do you account for the small black patches before mentioned? I fancy that a curd of albuminate becomes attached to the film, and prevents further action of the albumen.

There is another matter I am not clear about. How does albumen dispose of nitrate of silver? Is nitric acid set free? What happens if I dissolve albuminate of silver with ammonia? I have done this in the case of "caseinate."

I have tried the following experiment with both the organifiers, but you must take it for what it is worth:—I dissolved a quarter of a grain of nitrate of silver in a drachm of water. To this I added about half a drachm of the organifier, and mixed well together, some of the curds adhering to the sides of the glass. When I supposed that all the silver nitrate was destroyed (but of this I cannot be certain), I added some ordinary alkaline developer, the result being a liquid nearly as black as ink; the curds also darkened. Unless albuminate of silver is affected by the alkaline developer in the dark room—and I believe that this is not so—free silver must have been present; and, if so, I think the experiment shows the difficulty of getting rid of all trace of silver by means of albumen.

I have one question on a different matter:—What is there to be said against fixing a print, *before toning*, in diluted ammonia, and thus, as I imagine, getting a permanent print? I do not think that such a bath would destroy the surface of the paper, though if the paper were "caseinised"—not albumenised—I think such would be the case. At anyrate, with collodio-chloride this objection would not apply.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester, June 6, 1874.

[The stains complained of are, without doubt, due to the presence of nitrate of silver, which is eliminated, in a bath process, with great difficulty.—EDS.]

RECTIFICATION OF DATE.

To the EDITORS.

GENTLEMEN,—I appear to have omitted to give you the date of the year in which Canon Beechey proposed direct immersion of a plate in the preservative without washing. It was on August 2, 1872, that he published the letter from which I quoted in your columns last week.

I happen to have by me some of the nitric ether as originally used by me many years ago. It has been kept in a dark, cold place, and if the writer on the use of aldehyde in the developer, in your last issue, would like to have some of it to test I shall be glad to send it.—I am, yours, &c., H. STUART WORTLEY.

June 9, 1874.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—In order to increase the funds of the Photographers' Benevolent Association the board of management propose to organise a distribution of photographic works of art upon the principle of the Art Union.

To carry out this plan, will you kindly allow me to appeal through your valuable pages to professional and amateur photographers for donations of photographs, large or small, single or in quantity, mounted or unmounted. Parcels per post or otherwise to be addressed to the Secretary, 174, Fleet-street, E.C.—I am, yours, &c.,

174, *Fleet-street, June* 9, 1874. W. T. WILKINSON, *Secretary.*

P.S.—As a beginning, Mr. England has kindly promised a liberal donation.—W. T. W.

PIGMENTED BACKING *VERSUS* STAINED FILMS.—URANIUM DRY PLATES.

To the EDITORS.

GENTLEMEN,—Unfortunately I can endorse the statement of Mr. G. Brook, Jun., in your issue of June 5th, as to pigment backing. To say nothing of the mess caused by its removal previous to development, is backing necessary?

I have recently exposed three dozen of Colonel Wortley's stained films, and enclose prints of *Kenilworth Castle*, *Stoneleigh Abbey*, &c. They were taken with an old meniscus which cost me half-a-sovereign, and as a test were developed under these conditions:—Methylated spirit, tap water, ordinary pyro., ammonia, and bromide, no effort being made to ensure absolute purity. Each plate was developed, fixed, washed, dried, and varnished within fifteen minutes. The negatives and prints are untouched.

As an amateur actively engaged in business these films recommend themselves to me by their reliability, great sensitiveness, rapid, certain, simple and economical development (any gradation of density being obtained rapidly without intensification), and last, not least, a yellow, creamy deposit sufficiently dense to obviate any necessity for backing of any kind. In a few days I shall start on a trip up the Rhine, working round to Paris. I intend taking six dozen of these plates with me, and have the greatest confidence that, bar accident or breakage, on every plate I expose I shall secure a good picture; and, as I shall not develope them till I reach home, it will be a moderate test as to "keeping" between exposure and development.—I am, yours, &c.,

Coventry, June 8, 1874. C. AMBROSE.

[Three charming cabinet prints were enclosed.—EDS.]

To the EDITORS.

GENTLEMEN,—Mr. George Brook, Jun., in your last issue, complains that two dozen commercial dry plates which he exposed were spoilt owing to the finished negatives being "crowded with dust-holes," which had come from the "vile compound of gum and ochre" with which they were backed. He then asks the question—"Why do our commercial dry-plate people persist in using such rubbish?"

I do not know what other commercial dry-plate people use, but I may call his attention to the fact that the Uranium Dry-Plate Company have, for over eighteen months, stained the film itself with an aniline dye to prevent blur, which has rendered it no longer necessary for us to use the dust-producing backing; and we find the change highly appreciated by the numerous photographers who use uranium dry plates.—I am, yours, &c., THE MANAGER.

Uranium Dry-Plate Company's Works,
St. John's Wood, London, June 6, 1874.

PIRACY.

To the EDITORS.

GENTLEMEN,—As you have so favourably noticed my suggestion for the prevention of photographic piracy, I am encouraged to offer a few more remarks on the same subject.

If the idea can be successfully carried out in practice it would prove of value to other persons besides photographers. For instance, Messrs. Graves and Co. and other fine-art publishers, who have suffered such heavy losses from the practices of the pirates, could have the paper on which their engravings are printed impregnated with the fluorescent body either during manufacture or at some after-stage as might be found most convenient.

Makers of albumenised paper might also introduce a fluorescent substance into their preparations, and thus supply an anti-piratical paper ready for use.

By such means as these we may hope to shake off some of those miserable hangers-on of photography who degrade and disgrace the art by their dirty practices, and who compel the legitimate photographer to reduce his prices to the lowest level consistent with any profit at all in order to meet their unfair competition.

As I am merely an amateur I do not feel inclined to go to the expense and trouble of making the necessary experiments, but must leave the matter in the hands of such persons as have a commercial interest in the issue.—I am, yours, &c., F. B.

June 8, 1874.

OPALOTYPES.

To the EDITORS.

GENTLEMEN,—*Apropos* of the collodio-chloride question on opal glass, which I see is claiming a fair share of attention just now, I beg to hand you particulars of a very simple yet perfectly effective mode of working which gave me some very pretty results about ten years ago, before emulsions were thought of.

My pictures were made on opal glass with a matt surface, and on salted paper, damped and gummed to glass plates, and then allowed to dry. The surface was flooded with salted collodion, then sensitised in the usual paper bath, printed rather deeper than for albumen prints, and then washed and treated with the usual toning and fixing baths.

The salted collodion is prepared by saturating plain collodion with clean table salt, adding a few drops of water to the ounce to a pint solution.

To ensure contact of the negative and sensitive surface, and to secure perfect registering (at the same time permitting observations of the progress of printing) one edge of the plates may be *hinged* by a strip of gummed paper, and the other edges held firm by means of American clips.

I have purposely avoided minute formulæ, as, given the *rationale* of a simple process, the student should, I think, be allowed to work it out for himself He thus acquires an amount of knowledge impossible to the mere copyist of tabulated formulæ.—I am, yours, &c.,

34, *Argyle-square, London, June* 1, 1874. GORDON RAMSAY.

P.S.—I forgot to mention that the opal glass plates should receive a preliminary coating of salted albumen—say three ounces of albumen to one of water—and five grains of salt to the ounce. Of course this process is equally applicable to transparencies for the lantern.—G.R.

THE DISCOVERER OF THE COLLODIO-CHLORIDE PROCESS.

To the EDITORS.

GENTLEMEN,—May I be allowed to say that I have had a good laugh at the editor of the *Photographic News* owing to the frantic way in which he clings to his solitary photographic laurel? What a desolate and dreary existence his would be were he deprived of it! Have pity, therefore, and leave him alone. I have been familiar with this gentleman's name for many years, and have even read his paper frequently, but I have failed to discover that he ever enlightened the world on anything, so far as I can remember; and his own pet process—his "discovery"—was indeed a "find," but then it was only an old story furbished up from his own pages, as anybody having a file of the *News* can easily see. In the number for August 23, 1861, a translated paper of M. Gaudin's gives full details of the whole process. Whether or not the subsequent "discoverer" believes this date to be prior to his revelation in 1864 I certainly do, and I suspect so does everybody else.

It is most exasperatingly absurd, and it is almost getting too stale to be laughable. Ever and anon this grave personage comes forward and trumpets forth—"Behold the discoverer of collodio-chloride!"

"You didn't discover it; M. Gaudin did," says one.

"M. Gaudin never claimed it."

"What of that? here is his discovery in your own pages."

"It's untrue. He never worked it out; and I did."

"Possibly; but how could he have described in detail the mode of putting it on the sheet, and recommend it as an excellent thing for amateurs, almost in your own words written three years afterwards, if he had not tried it?"

Then, further prevarication being impossible, the editor aforesaid forthwith sets open the sluices of his abuse as a last refuge, and writes such silly letters as that signed "Fairplay," sometimes with diluted-acid comments appended in his fine Roman hand, and editorials wherein it is thought a great stroke to call THE BRITISH JOURNAL OF PHOTOGRAPHY the "*Liverpool* journal." By-the-bye, he should really drop that in the letters he writes to his editorial self, or gets his touters to write; everybody knows the dodge so well that, the moment such small artillery is brought into play, with a laugh the remark passes, "Hillo! here's —— doing a little stabbing in the dark again!" It is too patent, and almost childlike—if not childish—in the simplicity of its constant repetition. When a "discoverer" requires to stoop to petty dodges like that—well, considering it is the *one only* discovery, so far as I have ever heard, that a fellow ever tried wherewith to make his reputation, I really think he should be excused. Leave the poor man alone; he only pleases his own vanity just a little, and does nobody else any harm. It turns out, too, that any trifling modification which this single-discovery editor—he will become as famous as "single-speech Hamilton"—introduced in M. Gaudin's formulæ did not emanate from his own profound brain, for he states himself that at least two people suggested it to him.

It is, in truth, a pretty piece of business, and very droll—only so old! Most amusing of all is the pertinacity with which the borrowed plumes are clung to—no fabled goose turned peacock ever fought so grimly and long for the showy tail. The editor of the *News* likes to quote Shakespeare. I understand it is now the fashion for wits of the town to do so: The poet is patted on the back at every turn, and perhaps this gentleman may have heard that Dogberry was a favourite character of Sir Walter Scott's. The ageing novelist used often to quote Dogberry's saying that he was a man who had had losses, and apply it to himself, moralising on the half-boastful air the afflicted sometimes assume in speaking of what they have suffered. This is probably not the reason why the second discoverer of collodio-chloride loves Dogberry; for the loss of repute his discovery has brought him seems hardly to have come home to him yet, though the great example, if he know it, may not have been without influence upon his choice. But there is another saying of that famous civic dignitary's which, were this literary *drole* a wise man, might, I think, be appropriately often on his lips in this regard; and, even if he were not anxious to call boastfully all men to witness that he was an ass, the feeling that he had often, with his own hand, writ himself down one might not be without some power to prevent the frequent recurrence of that melancholy spectacle of a man clinging, like a drowning rat to a straw, to what he has no more right to than I have. I speak by the card; for I have raked out the documents, they lie before me, and I repeat the joke has become too stale. The battle ought at least to be shifted to other ground, and I should strongly advise the mistaken explorer to "appropriate" something new, if, indeed, there be nothing that he can *really* discover, such as a collodion made from horse-hair, or something strikingly original of that kind.

But for mercy's sake leave him alone; we have had enough of the collodio-chloride humbug in all its phases, and everybody knows as well as I do to whom the process, in all its essentials, properly belongs. If your contemporary editor chooses to raise Dogberry meditations on himself, what's the harm? He deludes nobody, and is happy if he succeed in deluding himself.—I am, yours, &c.,

June 8, 1874. HENRY EDWARD THOMPSON, M.D.

NEW PHOTOGRAPHIC SOCIETY.—We notice with pleasure that a new photographic society has been founded in Brussels. It is to be called the Belgian Photographic Association, and its aims are to be purely artistic and scientific. It is a wonder that, in so enterprising a small community as the little Netherland kingdom is, the national spirit of which is so well expressed in its motto, "*l'union fait la force*," the thing has not been thought of sooner. Hitherto all French-speaking people have been dependent almost entirely upon the excellent Photographic Society of France, but there is no reason why, while still looking up to that body as a great leader and central authority, subordinate societies full of life and vigour should not spring up whenever scope for them exists. We hope, therefore, that the new society will prove a boon and a success.

EXCHANGE COLUMN.

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

A double-discharge magnesium lamp, with reflector and paying-out reel, by J. Solomon, will be given in exchange for a chemical balance.—Address, M. A. SUTHERLAND, 21, Bourne-street, Hull.

One cabinet portrait lens and camera, and one mahogany show camera 15 × 14, brass bound, all nearly new, will be exchanged for outdoor apparatus of equal value.—Address, T. H. HIGGINS, 84, North-street, Leeds.

ANSWERS TO CORRESPONDENTS.

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

*** Several articles in type, reports of meetings of foreign photographic societies, &c., are "crowded out" this week.

HARRY HALLIER (Liverpool).—Received. In our next.

WILL O' THE WISP.—The book respecting which you inquire has not yet been published.

PATENT (Liverpool).—The cost will be from £7 to £8 for provisional patent. Send particulars.

HARTLEY WEBSTER (New Plymouth, Taranaki, N.Z.).—Postoffice order received with thanks. The accompanying instructions shall receive due attention.

"IN VAIN" (Shrewsbury).—The collodion is at fault. You must obtain some that has been kept so long as to be porous, or use some that has been made expressly having this quality.

H. P.—We recommend you to make your first attempts at burning-in photo-enamels by the large Bunsen gas stove you describe, and if you succeed according to your desire, it will then be for you to consider whether you would be justified in making the projected alterations.

S. S. CREWDSON.—Mr. Crewdson sends us three prints from negatives prepared by some simple dry process, of which he gives us no particulars. As the pictures are very fine, we should like to have full details of his method of procedure. Will Mr. Crewdson kindly furnish these to our readers?

REV. J. S. GREEN.—It is not advisable to leave the pigmented paper so long in the sensitising bath as to allow of the gelatine becoming perfectly saturated with the bichromate solution. The best test for sufficient sensitising is that it shall have become pliable and lie flat in the solution, at which stage it should be removed.

F. J. W.—Although your negatives have not arrived, we can unhesitatingly say that the markings do not proceed from dirty glass. The probability is that the use of a horny, impervious description of collodion has very much to do with it, and we recommend one that is riper or more porous. Perhaps the addition of a few drops of water to your present sample will bring it into good working order. These stains are more frequently found during hot than cold weather, and are familiarly known as "matt silver stains" or "oyster-shell markings."

AN AMATEUR (Leeds) writes to say that he has tried the plumbago process as published by Herr Obernetter, and which appeared in our Journal, and, as far as printing density and definition are concerned, with perfect success; but when he tries to reverse the film he finds that where the light has acted it will not leave the glass. In the last trial he made the collodion film came away with a thin copy of the negative, leaving the gum and nearly all the plumbago on the glass. Has any other reader experienced this? If so, what remedy was employed?

CARBON.—An Oxford correspondent, adopting this *nom de plume*, writes as follows:—"Will you permit me to ask through your pages for an explanation of the following failures in carbon printing, in the hope that, should others have been similarly plagued, the information might benefit them as well as myself?—1. Upon the removal of the paper supporting the tissue, after its transfer to the temporary support, the print is covered with minute blisters. These generally go down on drying, although they always leave a mark; but sometimes they burst.—2. When the squeegee is used a difficulty is experienced in inducing the tissue to adhere with sufficient tenacity to the temporary support, the support in question being the flexible one.—3. Notwithstanding every precaution the tissue *will* leave the temporary support when developing. This fault seems to occur more frequently with the black tissue than with the warm brown or the purple.—The proprietors of the autotype patents, in their otherwise excellent little manual, ignore all mention of failures—I presume from their having become such adepts at printing that they do not think failure possible at present. I have returned to my old love—silver; but I shall be only too glad to adopt the carbon if the manipulations can be reduced to a certainty. I may as well mention that the tissue in all cases was sensitised upon a bath of the strength given in the *Manual*; the various manipulations were carried out exactly as there laid down; the tissue dried in a box heated with hot water, and within two days; and great care was taken to chase away all air-bubbles when in the various baths. Is the flexible temporary support more liable to the above failures than the rigid? If so, measures should be taken to render the flexible support more perfect, as it is much to be preferred in every way to the rigid, being ready at a moment's notice, and no mess or bother with waxing solutions."——Probably some of our readers will give the information required.

HECTOR.—You do not properly discriminate between the terms "angular aperture" and "angle of picture." By the latter term must be understood the amount of subject included in the picture, while by the former is meant the relation of the size of the aperture in the diaphragm or stop to the focus of the lens. By the "field of delineation" is meant the surface upon which an image is distinctly defined in the focus of the lens. The field of illumination may be very large with a given lens by which the field of delineation may be very small. If a landscape lens have its diaphragm removed from it a sufficient distance it will show an illuminated field within which every object will be sharp from edge to edge; but, by pushing the same diaphragm close up to the lens, the field of illumination will be very greatly increased, while the field of delineation will be so much diminished as to exhibit perfect sharpness only in the centre.

SPOTTING-OUT COLOUR.—Mr. Robinson, of Trelawny-road, Hackney, has sent us a sample of his "spotting-out colour." We have tried it, and find that it answers the purpose intended remarkably well.

MATT VARNISH.—Many and various are the uses to which a good matt varnish may be put. It answers as a backing for a negative when it is desirable to work upon it with a blacklead pencil; it is almost indispensable in connection with stereoscopic transparencies; it forms, at a pinch, a substitute for a focussing-screen for the camera when the ground-glass plate gets broken; applied to a window, it prevents a curious gazer from seeing through it; in short, its applications are exceedingly numerous. These thoughts are suggested by the receipt of a bottle of Parson's "semi-opaque matt varnish," which fulfils, in a very effective manner, the above requirements.

PHOTOGRAPHIC EXHIBITION AT AMSTERDAM.—A photographic exhibition is this year to be held at Amsterdam, commencing on the 14th of September and lasting at least six weeks. The 15th of July is signified as the latest time up to which space can be taken. *Cartes de visite* and cabinet portraits will not be admitted as a rule, neither will coloured and retouched photographs, nor those which have been already published. Prints must be framed but without glass, and all must be sent carriage paid before September 1st to the "Commission Directrice de l' Exposition a la Société Arti et Ameeitiae à Amsterdam." The usual conditions must, of course, be observed. Ten per cent. commission will be charged on sales. We know extremely little about Holland in this country—far less than Holland knows about us—but this may prove no bad opportunity for our photographers making a beginning of an acquaintance with their art brethren—those whom, perhaps, we are rather ready to assume to be mere Dutch boors, forgetting that they have given us the sweetest, most natural, and homely school of painters in the world.

NEW PATENTS.

March 31, 1874.—"Improvements in Photographic Portrait Apparatus and other Optical Instruments."—No. 1,124. ADOLPH AND EDWARD STEINHEIL.

April 28, 1874.—"An Improved Machine for Burnishing Photographs, Cards, and other Like Articles."—No. 1,481. JOSEPH PARKER BASS.

May 8, 1874.—"An Improved of Retouching Photographic Negatives and Positives."—No. 1,634. CLAUDE LEON LAMBERT.

May 14, 1874.—"Photographic Albums."—No. 1,708. JOHN EDWARD HAMMOND.

LONDON GAZETTE, *Tuesday, June* 9, 1874.

PARTNERSHIP DISSOLVED.

TUCKER and AUSTIN, Newgate-street, photographers.

METEOROLOGICAL REPORT,

***For the Week ending June* 10, 1874.**

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
4	30·47	W	56	63	81	49	Fine
5	30·37	W	57	64	83	50	Fine
6	30·14	NE	62	66	77	59	Fine
8	30·27	E	55	60	74	46	Fine
9	30·16	E	53	64	81	51	Fine
10	30·17	W	60	65	—	54	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 737. Vol. XXI.—JUNE 19, 1874.

DERNIER EFFECTS.—NEW MEANS OF IMPROVING NEGATIVES.

One among several methods by which an effect of extreme porcelain-like softness can be obtained in prints is that said by some to be adopted by Dernier, which consists in coating both sides of the plate with collodion and developing an image on each film. As serious difficulties intervene in the way of securing in this way a *back* image of even moderately-good quality it has been suggested to take a second negative—a *facsimile* of the first one—and place it in the printing-frame along with the other, upon which it is superimposed, and from which it is separated by the thickness of the glass. If each of the negatives be so thin as to make both when used conjointly only to equal in intensity a good printing negative it follows that a print will be obtained having both sharpness and a certain softened effect, this being due to the fact of one of the negatives being separated from the paper by the thickness of the glass.

We have already shown how a similar effect to that obtained by Dernier can be secured by first printing, with an ordinary negative, to about one-half the extent required or, preferably, a little more so, and then removing the negative from its close contact with the sensitive paper and interposing a tolerably thick film of either oiled paper, gelatine, or other transparent substance.

Another method preferable—certainly as respects simplicity—to either of the foregoing was described by Mr. B. J. Edwards at the last meeting of the South London Photographic Society. The negative receives on its back a coating of sensitised tacky gelatine or gum, prepared as for the dust process, and for the preparation of which we have published several formulæ during the past month. When this coating has been dried the face of the negative is directed towards the light so as to print an impression through the glass upon the sensitive film on the back. This film thus becomes "tacky" inversely to the action of the light; hence the very deepest shadows are thoroughly hardened, while the most opaque portions are tacky, the intermediate parts being also so in a medium degree. When plumbago is brushed over the surface the result is that a second negative is formed upon the back of the primary one, the latter being, of course, much sharper than the former.

The method in question offers certain advantages, inasmuch as pictorial effects may be obtained by brushing the plumbago—and thus developing the image—in certain parts only, to the exclusion of others. But it is evident that the best effects can only be obtained on a very thin negative, or one taken expressly with a view to its being thus treated; for a negative of the ordinary kind, in which the high lights have already obtained their full quota of density, would, by the treatment now recommended, have that density so much increased as to render the negative quite impossible to print from.

There is another mode of improving negatives, and one which offers advantages of a far more important kind than the method just described—that which is based on the same principle, and has stood the test of practice during three years in the skilful hands of Mr. Whitfield. On the *face* of a thin negative—one purposely left thin in development—is applied the sensitive mixture, which, after being dried, is exposed to the light under the negative, so to speak, this being effected by merely holding the back of the negative to the light for a minute or two. The powdered plumbago is now brushed over those portions only which it is desired shall be intensified. The power of local intensification thus conferred is one which by an artist of skill and taste, may be utilised for the most important purposes. In portraiture the face may be produced with the utmost degree of brilliancy, while all the rest of the figure may be kept in any desired degree of subservience; this, in landscape work, will be simply invaluable. How seldom, for example, it is that trees receive the right amount of exposure which enables them to print properly; and more especially is this the case when there is a light-coloured house in the scene on which the photographer bestows his main efforts. By the adoption of Mr. Whitfield's method this inequality of illumination may be entirely avoided; and not only so, but the tables may even be turned entirely.

It is worthy of notice that the sensitive coating may be applied to the negative not merely after it is dried and varnished, but also immediately after being fixed and washed, and while it is still wet.

After the application of the plumbago the negative is exposed to the light to remove the last traces of stickiness; it is then washed with acid, as directed, and varnished.

AMMONIO-FERRIC OXALATE.

We propose occasionally to give an article upon the processes and method of making some of the chemicals used in photographic practice, but which are not generally known, or in certain cases where the generally-received chemistry in connection therewith is loose. The salt that appears at the head of this article is one of these. The only formula published is unreliable, and when we attempted to procure it commercially no two samples were alike either in appearance or chemical properties. In fact, it is extremely difficult to get this salt at all, as it will not be found enumerated in the usual lists issued by manufacturing chemists.

Watts, in his *Dictionary of Chemistry* (vol. iv., page 259), gives the following short notice:—A hot solution of ferric hydrate in acid oxalate of ammonia deposits this salt on cooling in small, anhydrous, rhombic octahedrons, having a greenish-white colour, and turning yellow when exposed to light. The salt dissolves in 1·1 part of water at 20° C., and in ·79 parts of boiling water. The aqueous solution exposed to sunshine gives off carbonic anhydride, and deposits ferrous oxalate in the form of a yellow powder. The salt is formulated $C_6 (NH_4)_3 Fe''' O_{12}$, and the above may be considered as nearly the whole of the published information available in connection with this compound.

One sample procured presented the appearance agreeing with the above description; that is to say, it was crystallised in octahedrons, having a bright greenish-white colour, but did not turn yellow on exposure to air. The other sample was nearly white with a slight tinge of yellow, and possessed the same shape as the other crystals. The specimens evidently did not consist of the other crystals metamorphosed, but possessed an individuality of their own. Crystals were observed possessing all manner of shades from white to intense emerald green.

The statement that these crystals turn yellow is evidently a mistake, probably produced by the writer generalising on observing a specimen containing two colours. We have a specimen of the green-coloured crystal over ten years old, and there is very little observable change, although the whole was freely exposed to light. There is hardly any decomposition providing the crystals are dry.

The two colours observable may be due to two different causes. The appearance may be simply owing to mechanical retention of coloured mother liquor between the plates, or it may be due to different chemical composition. In the cases examined it was mostly due to the latter; in fact, these crystals are an indefinite mixture, and not the true salt at all. This is evidenced by the following estimation of oxide of iron from different samples:—

	Percentage of $Fe_2\,O_3$
Crystals (obtained through a friend) having a bright green hue, with slight yellowish tinge	14·87.
White crystals obtained from the same source	2·71.
Crystals made according to the published formula	23·4.
Salt supposed to be made according to the formula of iron alums	29·52...32·1.

The determinations were made by igniting the ammonio-ferric oxalates in covered crucibles, to prevent loss, and then oxidising with nitric acid and re-weighing. Such a method, although more troublesome than an estimation with a volumetric solution of hyposulphite of sodium, has the advantage of eliminating the error that would be produced from the previous reduction of the iron salt by actinic influence. The great discrepancies observed must induce the suspicion that such products are indefinite compounds, and a little consideration will confirm this view of the question.

If we examine the published formula $(C_6\,(NH)_3\,Fe'''\,O_{12})$ we shall find that it resolves itself into the bivalent acid, dividing its equivalency between a monad and a triad, thus—

$$\frac{(NH_4)'_3\;3\,(C_2\,O_4)''}{Fe'''}$$

and, therefore, we are to saturate a given weight of oxalic acid with ferric oxide, then adding the same weight of oxalic acid, and neutralising with ammonia. When the *modus operandi* is conducted upon this plan, and the resulting yellow liquor is evaporated until it is sufficiently strong to crystallise, a small batch of crystals may be obtained agreeing precisely with our yellowish-white specimen.

Let us further evaporate the mother liquor, and a crop of crystals are obtained presenting the fine green appearance; but ultimately we get a liquid which will not crystallise any further, although of a syrupy consistency and strongly saturated with some double salt. Similar well-defined compounds we are acquainted with consist of these triad molecules combined with a monad, and obey a seeming law that it should be molecule for molecule; consequently, as ferric oxide is trivalent and oxalic acid is bivalent, it is more natural to suppose that this salt—the ammonio-ferric oxalate—is constructed upon the same type as the iron alums. Therefore we should not be justified in saturating an equal quantity of oxalic acid with ferric oxide and ammonia; but three parts of oxalic acid should be saturated with ferric oxide, and one part of oxalic acid with ammonia, the composition of the salt being—

$$Fe_2\,3\,(C_2\,O_4),\;(N\,H_4)_2\,C_2\,O_4;\text{ or, }Fe_2\,(N\,H_4)_2\,4\,(C_2\,O_4).$$

Based upon this theoretical view, therefore, we shall now give the formula which has been verified by practically making the salt. Take of—

Solution of perchloride of iron	A sufficient quantity.
Solution of ammonia	„
Oxalic acid	4 ounces.
Water	A sufficient quantity.

The solution of perchloride of iron (which is a commercial article) is diluted with a little water, and precipitated by an excess of the ammonia. By this means we get the hydrated peroxide of iron as a bulky precipitate. It is to be thrown upon a filter, and well washed until quite free from the chloride of ammonium, which is produced as the by-product of the decomposition.

Three ounces of the oxalic acid are then dissolved in eight ounces of water, and the whole is heated to the boiling point. On now adding the hydrated ferric oxide it dissolves. It is to be added as long as it dissolves freely; but a large excess of the oxide should be avoided. The other ounce of oxalic acid is then added, and neutralised with ammonia. We have now a greenish-brown solution, which, after filtering, may be evaporated to a syrupy consistence, and, when spread upon plates and dried at a moderate temperature, forms one of those pretty scale preparations with which we are so well acquainted. It is so soluble and deliquescent that it is impossible to crystallise it; and it is curious to observe that, although a weak solution is very sensitive to light, the strong-coloured liquor which represents a concentrated solution hardly suffers any decomposition. This fact is probably due to the protecting influence of the yellowish fluid; in other words, that the superficial layer protects the bulk of the salt from actinic influence. The scales prepared without any particular care to exclude the ordinary diffused light of a laboratory were remarkably free from the ferrous salt. If oxalate of ammonia be added to a solution of this preparation the green crystals will form on cooling; but if the yellowish crystals be crushed, and washed for some time in cold water, almost pure oxalate of ammonia is left, proving that these crystals must be a mechanical mixture. The scale ammonio-ferric oxalate should be preserved in yellow bottles. Its uses have been frequently pointed out in the pages of this Journal; and its sensitiveness to light in dilute solutions or on organic surfaces is remarkable.

A CONTRIBUTION TO THE SEARCH AFTER A SUBSTITUTE FOR GLASS AS A SUPPORT FOR THE SENSITIVE FILM.

So far as the production of a negative is concerned there is little doubt that no more perfect support for the collodion film can be obtained than glass, and for work in the studio there are few disadvantages that can be fairly urged as a set-off against its good qualities. When, however, we come to landscape work, and especially work on large plates, the objections to glass are so numerous and strong that there are few amateurs—or professionals either, we believe—who have not longed for something equally useful and less objectionable.

In the mere matter of expense most amateurs would be glad to be relieved of a portion of their heavy outlay in the item of glass—a dozen 12 × 10 plates, even if they are satisfied with crown, costing from eight to ten shillings; and when they are fastidious enough to use patent plate they pay at least twice as much. Worse than the cost, and perhaps more generally felt, especially by dry-plate workers, is the weight of the plates of large size, a dozen 12 × 10 adding from ten to twelve pounds to the weight of the camera—already sufficiently heavy—and its appliances. Those of our readers who are acquainted with the "foot-pound theory" will be able to calculate the amount of energy required to transport the additional weight from place to place; and all who have carried it up a hill on a warm summer's day will heave a sigh of relief at the prospect of getting rid of the encumbrance. Then, after the negatives are secured, there is the trouble of storage, which to those who do much is no trifling matter—one large box holding many, being heavy and difficult to handle, and numerous small ones being dear and bulky.

By far the greatest objection to glass, however, is its liability to get broken—a liability from which it is not exempt at any stage of the operation, and especially during transit by rail, as one of our friends discovered to his cost and annoyance a few days ago. He had gone north to Dollar, intending to spend a dozen large plates in the beautiful glen which leads up to the "Castle of Gloom." His "traps," including the box of plates, had foolishly been consigned to the tender mercies of the porters in the guard's van, and on his arrival at Dollar station, item by item was handed out, apparently in good order, till they came to the plate-box. It, too, *looked* all right, but as he took it into his hand there was an ominous rattle that sent a chill to his heart, which even the bracing northern air and glorious scenery, to say nothing of an application of the usua specific, mountain dew, failed to drive away. An examination showed that not a plate was left; in fact, the smash was so complete that the largest piece measured less than four inches square. The result of the misfortune was that our friend has resolved on two things—first, to give his acquaintances who experiment no rest till they have discovered a substitute for glass which will render such an accident impossible; and, second, that till such a discovery be made he will never trust his plate-box out of his own hands.

To his second resolution we commend the attention of all landscape photographers; and, with a view to aid him and others in the search after the desideratum, we have during the past few days made a series of experiments, which, although not by any means complete, we take the opportunity of laying before our readers in the hope that those who have leisure will devote a little of it to help on the good work.

In any search after a substitute for glass, undoubtedly paper is the first material which suggests itself. It is so easily obtained, so cheap, and withal so handy and workable, that if the granular structure were obliterated it could be made to answer the purpose admirably. We are afraid, however, we shall have to wait a very considerable time before our paper-makers succeed in giving us an article sufficiently free from structure, and so must look to something else in the meanwhile. We are aware that some exquisitely-beautiful work has been done on waxed paper, and we possess a few of the late Mr. D. O. Hill's negatives—some on waxed paper and some on plain paper subsequently waxed—which almost rival the finest collodion work of the present day. That gentleman, however, had few equals in the style of work in which he delighted, and fewer still possess the artistic power which enabled him to select and arrange his subjects in such a way that the grain in the paper seemed in most cases to be an advantage.

After numerous experiments we decided on gelatine as offering the most likely chance of success as a support, and on collodio-bromide emulsion as the most convenient sensitive film, and we set about trying to discover how best to utilise these materials. We need not trouble our readers with a detailed account of our experiments; it will be sufficient in the meantime to indicate in a general way the results at which we arrived, and the method by which we have succeeded in getting some very fair negatives.

Select a tough, well-made paper—sized by preference with resin rather than with gelatine—and give it a tolerably thick coat of a solution of rubber in benzole. This may either be brushed on, or the paper floated on the solution, which should be about the strength of four grains to the ounce. When perfectly dry it is coated with gelatine—about a thirty-grain solution used warm. Some further experiments are necessary to ascertain the best method of applying this solution. We succeeded very well by floating the paper on a forty-grain solution, letting it drip for a minute, and then laying it flat to dry. We think, however, that a better result is obtained by pouring the gelatine on a properly-cleaned and prepared glass plate, and then laying the rubbered paper down in the way usually adopted in glazing prints. The paper containing the rubber and gelatine film is then easily made quite smooth by pressure between two plates of metal, in the same way that paper is glazed, and is ready for the application of the sensitive film.

We do not suppose that, as a rule, amateurs would care to take the trouble necessary to produce the best results in this way, or that they generally would succeed to their satisfaction; but if the plan should turn out to be as successful as we have reason to believe it will, the manufacture will readily be taken up by those who have the requisite appliances, and who by practice would soon be able to make a perfect article, just as in the case of albumenised paper, which has almost altogether passed into the hands of professional albumenisers.

The next step in the process is to apply the emulsion, and for this purpose the prepared paper may be placed on a sheet of glass a little smaller than itself, the edges turned over, and the emulsion poured off and on in the usual way; or it may be fastened on a board by four pins, or fixed in any other way that will keep it flat. If the emulsion has been made by adding washed bromide of silver to collodion, and a trace of some suitable organifier added, it will only be necessary to dry the paper to make it ready for exposure. If, however, the ordinary emulsion be used, then it must be immersed in a dish of water and washed like an ordinary emulsion plate. After washing it should be pinned up for a few minutes to drain, and then floated on the preservative and dried.

The exposure must be made in a properly-constructed slide between two sheets of glass, and the development conducted in a dish with the usual alkaline developer, although our experiments would seem to indicate that a weak developer and slow action tend to better results than such strong solutions as we are in the habit of using on glass plates. After fixing and partial drying—that is, when the negative is still limp—it should be floated, face down, for a few seconds on the solution of gelatine, and then hung up or laid flat to dry.

The next step is to remove the paper, which has all through acted merely as a support for the film, and which, if left on, would sadly interfere with the printing qualities of the negative. This is easily effected by brushing over the back pretty freely with benzole. This softens the rubber, which is the only cause of adhesion between the paper and the gelatine, and the former in a few seconds may be easily peeled off, leaving the image-holding collodion film enclosed between two thin sheets of gelatine as structureless as glass, not liable to be broken, and which may be printed from on either side. The process is completed by a short immersion in a solution of alum or chrome-alum, which renders the gelatine insoluble, and hard enough to stand the wear and tear of any ordinary, or even extraordinary, amount of printing.

We do not, of course, introduce this as a perfect method—hardly, indeed, as a workable one—although we have, as already stated, got some pretty good negatives by it. Our object is simply to direct attention to what we consider the direction in which experimenters should work with a view to solve the above interesting question.

We shall continue our own experiments, and hope those of our readers who have time and opportunity will also make some trials and do what they can to aid in the attainment of the desired object. The advantages to be gained are undoubtedly great—a saving of at least seventy-five per cent. on the cost of glass; getting rid of a large amount of the weight, which is terribly exhausting to workers of large plates on a hot day; and total immunity from the occasional smash which too frequently causes a pang of anguish in the devotee of the camera.

The various manipulations, no doubt, *look* formidable, but in reality they are not so. A little practice will make them easy enough, and for those who like to work with the minimum amount of trouble there need hardly be anything to do at all. The makers of albumenised and sensitised paper would soon find it to their interest to send out such paper as we have indicated ready for the camera, as it could be sent by post as easily as sensitised paper, all that would be necessary being to cut it up into the required size and put it into the slides. Even that might easily be modified so as to do away with slides altogether, and have the paper on a roller at the top of the camera, which could be passed in squares to a roller below after each successive exposure, thus carrying sufficient sensitised surface for a week's work in the pocket of a great coat as easily as a roll of music. "Too good to be true!" some of our more sceptical readers may exclaim. We think not, and shall continue our experiments, returning to the subject as soon as we are in a position to give more definite information, and probably at the same time furnish designs by which any ordinary camera may be fitted with a simple roller arrangement. Meanwhile we shall be glad to hear that we have set our friends to work, and as "in the multitude of counsellors there is wisdom" we have no doubt that a rather suitable substitute for glass will by-and-by be found.

It has been suggested to us that it would be useful if we were to describe one or two more of the methods of making chlorine, or, more properly, a solution of chlorine, so as to afford every facility to those who are desirous of converting iodised and bromised collodion films into chlorised ones. The method we described in our last was one which we had found very simple and had adopted with complete success, viz., placing a small quantity of chloride (hypochlorite) of lime in a vessel of water, and adding to it a few drops of hydrochloric acid. We now describe other methods of liberating chlorine, and observe, in general terms, that if a current of chlorine gas, by whatever means formed, be transmitted through water, much of the gas will be absorbed, chlorine water, or solution of chlorine, being the result. Place one part of peroxide of manganese in a flask, and pour over it two parts of hydrochloric acid. Chlorine will immediately be disengaged; and if the mixture be warmed its liberation will be more rapidly effected. By means of a suitable tube the gas may be conducted into a vessel of water. Another method is by the substitution of bichromate of potash for the peroxide of manganese in the preceding experiment. Still another method is to triturate together sixty grains of chloride of sodium and three hundred and fifty grains of red oxide of lead, and put them with eight ounces of water into a stoppered bottle, afterwards adding two drachms of sulphuric acid. Agitate until the red oxide becomes white; allow to subside, and then pour off the clear liquid into another bottle. We have merely to observe that the method we described last week answers for the special purpose intended rather better than any of the other methods, whilst its preparation is extremely simple.

A FEW NOTES ON ALKALINE DEVELOPMENT.

[A communication to the London Photographic Society.]

I HAD intended, when offering to read a paper on the above subject to the Society, to have developed a series of negatives and transparencies before you at the time of reading the paper; but as there are already two papers that have precedence of mine I fear that time would not allow of my doing so this evening. There is one point in particular to which I desire to call the attention of dry-plate workers, as I find from various communications I have received that it is one which has not hitherto been sufficiently considered.

It will be remembered that last year I brought out the strong alkaline developer, and ventured to point out that the photographic world had, in confining themselves as they had hitherto done to a very weak alkaline developer, sacrificed at least three-fourths of the sensitiveness of any dry plates they may have been happening to use.

My friend, Mr. R. M. Gordon, was so struck by the results obtained by me that he at once adopted my method of developing, and has published his testimony to its value; and I believe that all dry-plate workers who have given the subject their attention have also adopted the strong developer in their work.

Now I find that dry-plate workers, whether using a weak or a strong alkaline developer, have not given sufficient consideration to the fact that where a negative requires an extra dose or two of ammonia to bring it out it is most desirable, if not indeed necessary, that a drop or two of strong pyrogallic acid solution should be added with each addition of ammonia. The reason of this would appear to be that the original amount of pyrogallic acid used with the developer becomes exhausted, and the added ammonia, having then no pyrogallic acid to assist its work, only produces surface-fog instead of continuing to develope the negative.

It should also be remembered that the amount of pyrogallic acid used at the commencement of the development has a very great effect upon the density of the resulting negative; and it is a most interesting experiment to make to cut a plate in half after exposure, developing one half with one minim to the drachm of pyrogallic acid, and the other half with six minims to the drachm of the same solution. This will show clearly the very great power we have of obtaining negatives of different character with alkaline development; and I may here take the opportunity of pointing out that to properly develope a transparency a small amount of pyrogallic acid only is essential, as otherwise the shadows block and become too dense and hard. I should have liked to have gone much more into detail on this subject had time permitted, but I will conclude by giving a formula for strong and very portable solutions for those who are travelling about with dry plates:—

No. 1.	Pure strong carbonate of ammonia	80 grains.
	Water	1 ounce.
No. 2.	Bromide of potassium	120 grains.
	Water	1 ounce.
No. 3.	Pyrogallic acid	96 grains.
	Alcohol	1 ounce.

To each drachm of No. 1 add one minim of No. 2 and from one to six minims of No. 3, according to the density of the negative required, remembering that it is always well not to have too much pyrogallic acid in the developer to begin with, in case strongly-lighted objects should thus come too dense at first; whereas, if we begin with from one to two drops of pyrogallic acid to each drachm, any amount of density can gradually be obtained by continued additions of two or three drops at a time of the pyrogallic acid solution.

If it be desired to replace the carbonate of ammonia by liquid ammonia, make up the developer with distilled water instead of the carbonate of ammonia solution, and to each drachm thereof add, as before, one drop of No. 2 and the necessary amount of No. 3, and pour two or three times on and off the plate; then add to the developing solution strong liquid ammonia (specific gravity 880) in the proportion of two minims to each three minims used of the bromide solution. The two formulæ will then stand thus for a stereo.-sized plate:—

Carbonate of Ammonia Development.

80-grain solution of carbonate		3 drachms.
120 „ „	bromide of potassium	3 minims.
96 „ „	pyrogallic acid (say)	6 „

Liquid Ammonia Development.

Distilled water		3 drachms.
120-grain solution of bromide of potassium		3 minims.
96 „ „	pyrogallic acid (say)	6 „

Pour off and on, and then add two minims of strong liquid ammonia (·880). If more density be required add more pyrogallic acid; if more detail is required to be brought out add more ammonia and some pyrogallic acid therewith.

I feel sure that no one who gives this method a fair trial will return to the use of a weak alkaline developer; for, while by the strong developer the sensitiveness of the plate is immensely increased, the chances of a plate fogging are infinitely less than with the old-fashioned weak developer.

It should be noted that this system of development is suited to gum-gallic, tannin, beer, and other bath plates, as well as emulsion plates. I show two negatives of different densities.

H. STUART WORTLEY.

FURTHER EXPERIENCES WITH THE PLUMBAGO PROCESS.

SINCE writing my last article I have made some further researches in this useful method.

The greatest difficulty I experienced was getting the glass into such a state that the film should take evenly all over it. No matter how chemically clean we get the glass there still seems a tendency of the solution to leave it in patches.

To obviate this I now proceed in another manner, which, besides getting over this difficulty entirely, possesses other advantages. I take the glass (in this case extra cleanliness not being so much an object) and coat it with a thin, porous, plain collodion. When thoroughly set I wash it under a tap until all greasiness disappears. I now drain it on blotting-paper for a short time, and having taken a small quantity of the sensitive solution freshly filtered I pour it over the plate several times, each time from an opposite corner, and, after draining for a short time, I dry it over a Bunsen burner, and expose and develope it in the usual manner.

When sufficiently developed I coat it again with collodion, but this time with a much thicker sample, and, having levelled it, leave it to dry. When this has been accomplished I place it in a bath of water acidulated with hydrochloric acid, and, after a short space of time, the film detaches itself from the glass, and should be placed between blotting-paper till dry.

The coating of the sensitive gum solution prevents the thick collodion from dissolving the thin, the image being protected on both sides. I think this a far better method of getting a reversed negative than running the risk of removing from its support a valuable one; and, as plate glass must be used in this method of reproducing negatives, the extra time and trouble of removing them is less than the value of the plate glass, besides the advantage of being able to print from either side. The same principle by which the plumbago negatives are made has been utilised by my friend, Mr. G. Whitfield, for strengthening ordinary negatives; and from my own experience I think this will prove a very valuable application, as the intensifying may, so to speak, be localised, and effects got that could not be obtained by the ordinary methods of redeveloping.

Having taken a negative and developed with iron allow the superfluous moisture to drain away, and proceed exactly as I have described in the earlier part of this article; that is, coat with the sensitive collodion, dry, and expose to light. The blacklead may then be applied until the desired effect is produced—the most work being laid on a weak foreground, for instance, and the least on a delicate sky—thus securing that harmony so often found wanting in a negative redeveloped in the ordinary way.

It must be borne in mind that the blacklead process will not bring out more detail, which may be often accomplished by silver redeveloping, although I have noticed that details in the blacks which could hardly be observed were made to show plainly.

I may add that I think it advisable, before treating the plate to the acid, to allow it to lie face downwards in the sun, so that *all* the coating becomes thoroughly hardened. WALTER B. WOODBURY.

ON THE GELATINO-BROMIDE PROCESS, WITH A DESCRIPTION OF AN EASY METHOD OF WORKING IT BY USING THE "SENSITIVE PELLICLE."

[A communication to the London Photographic Society.]

THE general subject of "gelatine as a vehicle for silver salts in the production of negatives" having been introduced by Mr. King's interesting paper,* I propose to follow up the subject by describing the method that I employ. I may mention that the use of gelatine as a substitute for collodion is a matter to which I gave serious attention many years ago. I have always been interested in experimental photography, my first commencement being with daguerreotype nearly thirty years since. I have taken interest in, and worked at, nearly all the various processes that have arisen since that time, always as an amateur. Among other of the old methods of preparing dry plates that of Dr. Hill Norris particularly interested me. I was convinced that most of their excellent qualities, and especially those of their certainty and the long retention of their sensitiveness, were due to the final coating they received of gelatine. I thought that if this material played so important a part, why could not the collodion be dispensed with and gelatine be used exclusively? I was an early worker in Major Russell's tannin process; and when he took to using a bromide process exclusively I tried his method, but I used gelatine only, and I formed the bromide of silver in an emulsion of this material—much as we now do. I also added iodides and chlorides to the bromides. I used the acid pyro. developer at first, but I finally settled down to the alkaline method when Major Russell showed its superiority. Of course I had no end of failures in trying to work out a process in this new direction; but a serious illness of six years' duration stopped all my photographic experiments. As a worker in gelatine, therefore, I do not appear as a novice, but rather as a veteran.

My interest in the subject was revived about this time last year, when Mr. Burgess, of Peckham, announced the sale of his gelatino-bromide emulsion. I obtained some of it, and I immediately recognised a similar preparation to that I used to make some years previously.

On referring to my old note-book in which my experiments were recorded I found a formula by which a sensitive emulsion could be made similar to Mr. Burgess's. I showed the preparation and negatives obtained with it to Mr. J. T. Taylor, of THE BRITISH JOURNAL OF PHOTOGRAPHY, and promised to publish the formula. As Mr. Burgess was then deriving some benefit from the sale of his emulsion I did not at the time, in deference to his wish, publish my method. I thought also I might make some further improvement in the only weak part of the process—the preparation of the emulsion—so as to enable it to have "keeping" properties.

Since then I have followed up my experiments, and, although I have not discovered a method of preventing the prepared sensitive emulsion from spontaneous decomposition, yet I believe I have done something better; for I have discovered a means of preparing the gelatine so that *in a dry state* it shall contain the sensitive salt. The material can therefore be purchased in a state ready for use by dissolving in warm water; and in this dry state it will keep good for years. My object in this paper, then, is not only to show that the gelatino-bromide process is a really good working process, but also to prove that the only troublesome part about it—the preparation of the emulsion—may be avoided by obtaining, as an article of commerce, the material ready for use. In former times it was the custom much more than it is now for photographers to prepare their own chemical compounds. It is now found that these things can be better done by people who make it their special occupation; hence photographers now rarely prepare their own collodion, make their varnishes, or albumenise or salt their papers. Such being the case, I do not believe that it is sufficient to merely describe how the materials are to be prepared in order to get a new process into general use.

* To be found at page 294.—EDS.

Different methods have been published by Dr. Maddox, Mr. King, Mr. Bolton, and others of forming a gelatino-bromide emulsion. It is not so difficult to make as a collodio-emulsion, as all the solutions are aqueous ones, yet it requires care. Any good gelatine will probably do; but my experience is with Nelson's, which answers admirably.

I take one pound of this gelatine and place it in a porcelain dish, to which I add 100 ounces of distilled water, and allow it to stand and swell for about three hours. It is then heated by a hot-water bath until dissolved; while hot eight and a-quarter ounces of bromide of potassium are next added, which must be thoroughly incorporated with the gelatine by stirring, and eleven and a-quarter ounces of nitrate of silver, dissolved in as little water as will take it up, are then added, and the whole to be well mixed while the gelatine is still hot.

When the silver is added, all the subsequent operations must be done in a non-actinic light; and the material thus formed constitutes the sensitive emulsion. It is not, however, in a condition ready for use, as it contains free bromide of potassium and the nitrate of potash formed by double decomposition. These salts must be removed, or else they will form crystals in the film and spoil the plate. Mr. King removes these salts by the scientific process of *dialysis*. I proceed in a different way. I pour the emulsion into a porcelain dish to the depth of about a quarter of an inch, and let it become cold and set. I then cut it into small strips, and wash in many changes of water, or use running water, just like washing prints from the hypo., until all the free bromide and nitrate of potash are dissolved out. The material is now in the condition to be dissolved in hot water ready to coat plates with, and if no greater quantity be made than can be conveniently used at one time, the plates can at once be prepared and the emulsion used up, but unless the material can be so used immediately it cannot be depended on. I have sometimes, in cold weather, been able to keep it good for a fortnight; and in summer time I have known it to decompose in a few hours. It is true that many things may be added—such as carbolic acid or alcohol—to arrest the tendency to decomposition; but in my experience there are other drawbacks which accompany these additions, and my decided impression is that no such attempt should be made, but that the emulsion should be at once used by coating the plates, and then, when dry, the plates will keep good for years.

To obviate the necessity of thus immediately using up the prepared emulsion my invention comes in. I take the concentrated emulsion, after it has been well washed from the removable salts, and place it in suitable dishes, evaporating the emulsion till it is of the consistency of thick paste. I then let it cool, and, removing it from the vessels, complete the drying on suitable frames. When dry it can be cut into portions of convenient size, and in this condition is ready for immediate use by simply dissolving in hot water. As much or as little may be dissolved at one time as there are plates to be prepared; but as the plates will "keep" indefinitely, there is no need that any should be lost if sufficient plates be ready to use up the dissolved material.

This dried sensitive material I have called my "sensitive pellicle."

To use the "pellicle" the quantity necessary to coat the number of plates proposed to be used is dissolved in the proper quantity of water according to the directions that accompany each packet. When thus dissolved the emulsion is in exactly the condition as if the person had originally made the preparation himself. All the subsequent operations are just the same as are given by Mr. King and other workers of the process.

My mode of working is this:—I slightly warm the plate, pour enough of the warm emulsion to make a pool in the centre of the plate, and with a glass rod guide the material to the edges, pouring the surplus back. The plate is then placed on a level surface—a shelf, for instance—to dry. If prepared at night, the film will spontaneously dry by the next morning.

You will observe that there is no preliminary coating of the plate required, no after-washing necessary, and no "organifier" or preservative solution to be floated on or washed off. The gelatine is its own "organifier," and the plates will keep indefinitely if preserved from light and moisture.

The exposure required is certainly not more than for the most sensitive wet collodion. Nearly all the failures from the use of this material which have come to my knowledge have arisen from an under-estimate of this sensitiveness. They have been from either too much light in the dark room or from over-exposure in the camera.

After exposure the plate is soaked in water for a short time, and the usual alkaline developer is applied; the image comes out quite as quickly as on an ordinary wet plate. Sometimes a little intensifying is necessary; this may be done before or after fixing in the hypo. The greatest care is necessary not to carry the intensifying too far, as the colour of the deposit is so much more non-actinic than collodion negatives. After washing from the hypo. the film dries spontaneously in about the same time as a collodion one; but heat may be used to hasten the drying. When dry the film is sufficiently hard to permit the negative being printed from without varnishing. If the negatives be intensified too much the surplus intensity can easily be removed, and if not intense enough fresh vigour can as easily be added.

In conclusion, and before I commence my demonstration, let me urgently call on you to give this gelatino-bromide process a fair trial, whether you use my pellicle or prepare the emulsion for yourselves.

I believe it to be the easiest, the quickest, the cheapest, and the least destructive to the health of all the various means by which negatives can be produced. The general process is free from all restraint; the only part I claim for myself is my own invention, the drying of the emulsion and the capacity of thus keeping it in a dry state ready for immediate use. R. KENNETT.

STAINED FILMS *VERSUS* BACKING PLATES.

THE question which several of your correspondents have raised—that of stained films *versus* backing—is one which has not by any means escaped my attention in the course of my emulsion experiments; and though I do consider the use of a pigment backing a trouble, and one from which I have always tried to escape, I do not yet see the way in which it can be done without the loss of qualities worth more than the gain.

It is very little trouble to rub off the backing, and, when off, the development can be followed much more accurately than with a stained film; and there is no loss of sensitiveness to deplore, as there is inevitably with a stained film. As for the dust on the film, he must be a very careless operator who neglects to pass a soft dusting-brush over his plates before putting them into the slides, and they must be very questionable films which will not resist even rubbing with cotton wool quite briskly without injury to the negative.

I have been through an elaborate series of experiments with the Liverpool Dry Plate Company's new emulsion to ascertain the effect of aurine on the film, and find that the presence of as much as will answer the same purpose as the ordinary red backing makes nearly twice the exposure necessary, and, what is still worse, leaves in the film drying-marks of a most disagreeable character, which are enormously exaggerated by drying under great heat or change of temperature during drying. These do not show much in a foreground full of detail, but in skies and delicate distances they are disastrous. It would certainly be to the manufacturers of dry plates a great convenience to use the colour in the emulsion; and if they continue to use the backing it is because it gives advantages which the other does not. I have emulsions which require neither colour nor backing, but which by the possession of an opaque, matt surface, resembling unglazed porcelain, absolutely prevent halation; but the quality of the image is always inferior to that of the samples giving a lustrous surface, which also resists better the action of time and humidity.

I am quite prepared to confirm what Mr. Sutton says of the needless complication of the emulsion process by the addition of foreign substances. If we have our pyroxyline and bromide of silver in the proper chemical state, the less of other materials we get in it the better. The quickest dry plates I have ever made (except with gelatine emulsion), and which were also the most readily intensified by the alkaline developer, had neither free nitrate nor preservative either in the emulsion or the finished plate, but had in the former state a large excess of bromide, and must, in accordance with Mr. Sutton's experience, contain a trace of it in the finished plate. The fact, which no one questions, that we can get a dense image with a bath plate without any organic substance and with less silver than an ordinary emulsion film contains, and that a washed bath-bromide plate is quicker than any other and intense enough, goes to prove that the only use of the "organifiers" is to control the deposit of silver, and that if we can control this without the addition of organic substances to the emulsion we are better off than with them. This I have proved to be the case in experimenting on the Liverpool Dry Plate Company's emulsion—a pyroxyline treated in a certain way giving the greatest density one can ask, as well as high sensitiveness, without any organic substance being added, the problem being solved by the treatment of the pyroxyline and the consequent variations in the manner of forming the bromide of silver in the emulsion, which variations again control the state in which the silver shall be reduced in the image.

I will show, with two emulsions made from the same pyroxyline treated in two different ways, without any variation in the proportions or substances employed, that the same chemical substance may give, under the same development, results so different in character that one film shall give an image unexceptionable in quality, while the other is thin, poor, and fogged, and no chemical analysis shall tell the nature of the difference, nor can I explain or understand it myself. This being so, is it not clear that the question lies behind all "preservatives," "organifiers," &c., &c.? I must say that my final results are at once the best and simplest I have ever attained, and if I hope to better them it will be by simplifying them. W. J. STILLMAN.

UPON THE SENSITIVENESS OF THE SURFACE OF TINTED BROMIDE OF SILVER TO THE DIFFERENT COLOURS OF THE SPECTRUM.*

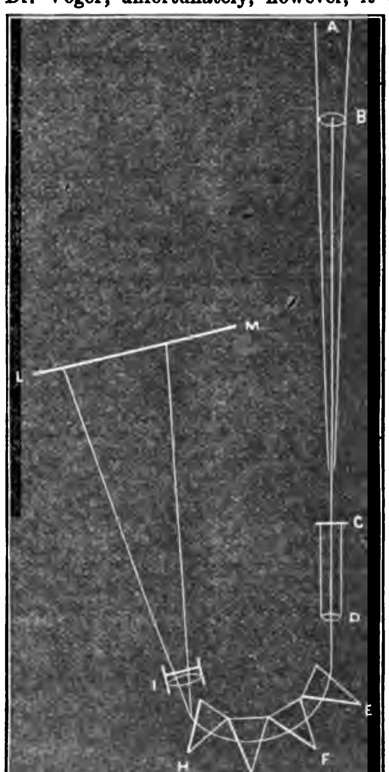
[A communication to the London Photographic Society.]

IN the month of December last I became acquainted with the researches of Dr. Vogel upon the sensitiveness of dry plates to the red and yellow rays of the spectrum. According to Dr. Vogel a plate prepared with bromide of silver is sensitive only to the rays of the spectrum more refrangible than the green; whilst if the bromide film be coloured yellow or red it becomes sensitive to the yellow and red portion of the spectrum at the same time.

Dr. Vogel goes so far as to lay this down as a general law. He affirms that by adding to the bromide of silver any colour which absorbs a certain part of the spectrum the maximum of sensitiveness in the bromide will be found in this portion.

For some years past I have occupied myself with spectrum observations, with the object of determining by photography the coincidences of the ultra-violet rays with the brilliant rays of metals and gases. I have, moreover, sought means to establish these coincidences in that portion of the spectrum visible to the eye; but all my efforts have hitherto been in vain to obtain photographic reproductions in the green, yellow, orange, and red.

I was therefore in a great hurry to employ the method indicated by Dr. Vogel; unfortunately, however, it was only during the last few weeks that I have been enabled to establish my apparatus satisfactorily. Another motive I had for repeating the investigations of Dr. Vogel was this:—We know that all opticians, when they desire to construct a lens free from aberration for the chemical or actinic rays, always start with the assumption that the maximum sensitiveness of our photographic films is to be found near line G in the indigo portion of the spectrum. Now, if this maximum be displaced, as would have been the case upon the coloured surfaces of Dr. Vogel, there would be no plan of rendering an objective free from aberration in the above sense for all photographic processes alike.



Thus, a lens exempt from aberration for the ordinary collodion process would have a considerable amount of aberration when used with bromide of silver tinted red, yellow, &c. It became a matter of urgency, therefore, to thoroughly establish the soundness of Dr. Vogel's discovery, and I desired to do so with the most perfectly-constructed apparatus.

The description of apparatus I employed was as follows:—At A was placed a heliostat—Leon Foucault's construction—having a silvered mirror which reflected the rays in a horizontal direc-

* This paper, and the succeeding "Note," were both presented by Dr. Monckhoven to the Photographic Society through Mr. J. H. Dallmeyer, by whom they were read.—EDS.

tion. In the path of the solar beams I placed a condenser*, five centimetres in diameter, and ninety centimetres focus. The solar image was thrown upon the slit C of the spectroscope, formed by a collimeter C D of eighteen inches focus. The dispersion was obtained by four large prisms of forty-five degrees, made of Chance's extra-dense flint glass. The lens of the spectroscope was replaced by a lens (I) of ninety centimetres focus, mounted in a bellows camera.

The image L M of the spectrum is received upon a movable plate in such a way that one may secure several impressions upon the same plate.

By reason of the considerable dispersion of the four prisms, it was impossible to obtain the whole of the spectrum upon one plate†. Besides, focussing would be impossible, as every portion of the spectrum has a corresponding different focus.

The spectroscope which I have just described is in other respects identical with that of Kirchhoff. It may be seen from the negatives which accompany this memoir that all the rays marked upon the spectrum of Kirchhoff, even the finest, are here reproduced. This fact, I think, will be taken as a standard of the precision with which I have worked.

My friend, Mr. Dallmeyer, will, moreover, exhibit to the members of the Society a photographic reproduction of the Kirchhoff spectrum, which I have produced expressly, and another image of the spectrum, which I owe to the kindness of Mr. Rutherfurd, of New York, obtained direct by photography, and upon which I have marked all the corresponding lines of Kirchhoff.

When a wet collodion plate is exposed in the spectroscopic apparatus which I have just described (the opening of the slit being one-thirtieth of a millimetre) for a brief period—five seconds, for instance—a spectrum of B is obtained, limited to the indigo. I have focussed this portion of the spectrum with particular care, and every one may see the absolute clearness of the lines, the finest corresponding to portions 2700 to 2870 of Kirchhoff. To do this it is necessary to place the plate against a well-lighted ground glass and to employ a powerful magnifier.

The maximum sensitiveness of our plates for the solar spectrum is in the indigo.

The same plate being submitted to an exposure in the apparatus for two minutes (see Plate I., spectrum A) the action extended on one side to H H′, and on the other to E. But the clearness of the rays disappeared by a phenomenon analogous to irradiation. The lines spread on account of excessive development. Moreover, the focus having been made at G, all the other lines lack clearness.

In Plate II. line F was focussed; it carries three spectra—the first, C, exposed for four minutes, the two others twenty seconds. Upon this plate can be seen clearly in spectrum C all the lines comprised between G and *b*, and the image extends to beyond E, to 1450 of Kirchhoff.

I experimented with other wet collodion plates, but, notwithstanding a prolonged exposure, I was unable to get beyond the limit of 1450 in the Kirchhoff tables. Plate III. was focussed upon lines *b b″*, and shows with exceeding clearness all the lines of Kirchhoff from 1660 to 1450. These last lines are wanting in Rutherfurd's spectrum, the latter, no doubt, not having employed a condenser.

Plate IV. represents two spectra obtained upon bromide of silver alone, without iodide in the collodion. The lower half of the plate has been submitted, in the first place, to the action of weak daylight for a few seconds. This last carries the spectrum H; the upper part of the plate the spectrum G. Each image has been exposed two minutes in bright sunshine.

This plate shows all the lines clearly, and proves that bromide of silver employed in wet collodion is not more sensitive to green than iodide, for the impression is identical with that of Plate III.

Finally: Plate V. is prepared with collodion containing a little coralline to tint the film red; and as I am entering here upon Dr. Vogel's experiments I will detail my plan of working.

The collodion contains two per cent. of the double bromide of cadmium and ammonium; the silver bath was of eighteen per cent. strength, and the plate was immersed for ten minutes. The plate was exposed for five minutes to the action of the spectrum, the focussing being made at E. The development was conducted with iron in the ordinary manner. I imperfectly fixed the plate, which is still red with the coralline it contains.

An examination of the image shows that it is perfectly defined between H H′ and E. But it is evident that not a line has rendered itself visible in the yellow and red. In one word, the plates tinted with coralline and the untinted ones are identical. The same result was obtained with aniline green.

I then tried a dry plate produced with bromide of silver, placing in the preservative coralline, Bismarck yellow, fuchsine, &c. In a word, I varied my experiments in every possible way, and in none of them did the image transgress the limit of 1450 of Kirchhoff; indeed, on some of these plates I obtained no image at all.

I also experimented with coloured papers, but without any result.

I must confess that these negative results have filled me with surprise; nevertheless, if my information be correct, in Bunsen's laboratory at Heidelberg similar results also have been obtained. I have just received a letter from an illustrious French physicist, who also tells me he has obtained no results at all. From the *Ecole Normale*, and the *Conservatoire des Arts et Metiers*, in Paris, from Mr. Norman Lockyer, Mr. Spiller, and Colonel Stuart Wortley, in England, and Mr. M. Carey Lea, in America, the same negative results are reported.

Therefore I conscientiously believe Dr. Vogel to be in error. An attentive examination of Dr. Vogel's memoir and my own results may perhaps be instrumental in discovering the origin of the error into which our estimable author has fallen.

Dr. Vogel affirms that the colours of the spectrum are absolutely pure. This is true in theory, but not so in practice.

In the first place I remark that Dr. Vogel uses a slit of a quarter of a millimetre in width and only one prism of flint glass. This slit is ten times larger than those which are ordinarily employed, and does not allow one to see the lines of the spectrum with clearness. Besides—and this is an essential point—the glass prism is not absolutely transparent, and diffuses rays of every refrangibility over the whole photographic surface. Finally (and this applies especially to apparatus of several prisms): as the pencil of rays refracted by the prism has a large angle of divergence, it always happens that a portion of the red is reflected upon the interior wall of the tube of the eyepiece when the violet is under observation, and the violet is reflected when the extreme red is being observed. This is why coloured glass is always placed in front of the slit by Kirchhoff and others. If the red is being examined, especially in the neighbourhood of line C or A, a red glass is employed; or if it be the violet, then a violet glass is placed in front.*

To convince the members of the Society of this phenomenon of the diffusion of light over the whole surface of the photographic plate I produced Plate VI. with a direct-vision spectroscope composed of five prisms, equivalent for dispersion to two prisms of flint glass of 60°. It is understood that I have employed a small slit one-twentieth of a millimetre to render all the lines visible.

The upper spectrum was obtained in five seconds. It is limited by the blue and indigo. The spectrum in the middle has been exposed for one minute; the lowest for ten minutes. It reaches beyond the violet and red. When one is not on one's guard, it seems as if the whole spectrum has been obtained. But it is only the diffused light which illumines the prisms that has acted; and the proof of this is that neither the vertical lines which characterise solar light, nor the long horizontal lines which come from the shutters of the slit, are visible in those parts of the spectrum. The spectrum of one minute and that of ten minutes are in reality alike.

I am quite convinced that Dr. Vogel's plates do not show the double line D, nor the lines C, nor the lines B and A of the solar spectrum.

To obtain these lines with all the clearness of Fraunhofer's spectrum only an ordinary spectroscope is necessary, with one flint prism of 60°. But the slit must be narrow—for instance, about one-twentieth of a millimetre. Neither, as has been affirmed by Dr. Vogel, is the bromide of silver coloured red with coralline so sensitive to the yellow and to the red as it is, under ordinary circumstances, to the blue and the indigo with a ten seconds' exposure to the solar spectrum; for, under these circumstances, in ten seconds I obtain the violet, indigo, and blue with several hundreds of lines upon a dry bromide plate.

If Dr. Vogel would expose one of his plates in an ordinary spectroscope with a narrow slit for only a few seconds towards evening, he would find that he would obtain a splendid spectrum with all the lines of the solar spectrum, together with other lines due to absorption of atmospheric moisture.

The publication of a spectrum by photography in one of the journals is the most practical plan for Dr. Vogel to pursue in order to decide whether he has discovered a new process or not; for a photographic spectrum of these regions of the spectrum would be a proof beyond cavil of the results stated to have been obtained by him. All other arguments would be valueless against this.

At the same time, as Dr. Vogel promises, in reply to Mr. Spiller, to publish his method of proceeding in every particular in Poggendorf's *Annalen*, I propose, as soon as they are made known, to follow them accurately and publish the result. D. Van Monckhoven.

NOTE UPON THE FOCUSSING OF SPECTRUM LINES IN SPECTROSCOPIC OR ASTRONOMICAL OBSERVATIONS.

If an examination be made of Plate I., spectrum B, line G, with a microscope magnifying twenty diameters, and especially of the parts marked 2625 and 2800 of Kirchhoff, there will be seen a multitude of fine lines. To observe these lines in a spectroscope fitted with four prisms of flint glass a comparatively powerful magnifier is necessary. From this it may be guessed how difficult is the focussing of such an

* The object of the condenser is to give the spectrum a much greater degree of intensity than that possessed by direct solar rays only. The clearness of the rays is in no way affected if the opening (that is to say, the relation of the diameter to the focal length) of the condenser be less than that of the lens of the collimeter and the prisms be of sufficient dimensions.

† The total length of the spectrum was more than forty centimetres.

* Or between the eyepiece and the eye. The eyepiece in photographic observations is the sensitive plate. Therefore, it is better to place the coloured glass in front of the slit.

image. If an error be made to the extent only of a thousandth part of the focal length of the lens a great loss of sharpness ensues.

Now, if a ground glass be used, produced with the finest emery powder, none of these fine lines are at all visible. The structure of the ground glass itself, viewed under a powerful magnifier, is very coarse; and if a line be drawn upon it with a hard blacklead pencil sharpened to a point the line is thickened on account of the grain on the glass.

The focussing of the fine lines of the spectrum, or of microscopic objects reflected upon a screen, or of celestial bodies, is therefore impossible with the aid of a ground-glass screen. It has been proposed to replace the same with a collodion plate exposed, developed, and fixed. In this way a transparent plate is secured, upon which is deposited a very fine precipitate of silver. By employing a magnifier of Ramsden's construction it is possible to focus at one time the particles of reduced silver upon the film of collodion and the image. But, after all, this is very difficult in practice; for the silver deposit still presents too coarse a grain, and the finer objects are not seen at all.

Sometimes Ramsden's eyepiece is employed, adjusted in such a manner (upon a transparent, polished, glass plate) that one side of the plate is in focus, and then the ground glass is replaced by a sheet of ordinary transparent glass. This method, however, simple enough in theory, gives rise to serious errors in practice.

The plan I adopt is the following:—To focus delicate objects I move the ground glass to and fro in its proper plane; and to accomplish this the ground glass is placed in a frame adapted to the purpose. The grain disappears by the effect of the retention of the image upon the retina for a certain time, in the same way as the teeth of a cog-wheel disappear when the latter revolves rapidly.

The method is a very simple one, and is well adapted for projecting the lines of the ordinary spectrum. But when it is a question of very fine lines—such as the delicate one between the lines D and D' of the spectrum—then I make a revolving disc of glass covered with a film of very thin collodion, which is sensitised, exposed, and fixed. It is necessary that the glass be very flat. Then, on applying the microscope, it is possible to focus the finest lines of the spectrum, as also the most delicate astronomical objects—such as the companion of *Polaris*, &c.

Many who have experienced difficulties in focussing for very minute objects will find, I think, the method I have here indicated to be a very useful one. D. VAN MONCKHOVEN.

GELATINE AS A VEHICLE FOR SILVER SALTS IN THE PRODUCTION OF NEGATIVES.

[A communication to the London Photographic Society.]

THOUGH the use of gelatine as a vehicle for the salts of silver sensitive to the action of light was suggested as early as 1869 by Dr. Maddox, and the problem of its successful application was solved last year very completely by Mr. Burgess, of Peckham, no formula or method of working has been hitherto submitted to the criticism which a body constituted, like this Society, both of scientific experts and skilled manipulators can bring to bear on such subjects. Nothing has yet been done to elicit an authoritative opinion as to the value of the innovation; and, as those who have placed their preparations of gelatine in the market have naturally kept their secrets to themselves, the only point which societies have had to discuss hitherto has been the merits or shortcomings of the negatives produced by their aid. Under these circumstances it has been suggested to me that as I have published the result of my experiments, which have led me to a process moderately simple and certain, I should invite the Society to give an opinion on my method, in the hope that discussion may settle the question as to the value of gelatine when used as a substitute for collodion.

I come before you, therefore, not as a successful inventor, but as a modest inquirer; and in this character I hope that, though the cause I plead for may fail to secure your verdict, the failure may not be credited to the presumption of the advocate.

The only combination I have at present tried is that of gelatine and bromide of silver. I practised Mr. M. Carey Lea's chloro-bromide process in India, and have become a convert to the emulsion school of dry-plate workers. My first trials with Burgess's gelatine plates were successful, and I thought I recognised in the negatives a delicacy and softness not often seen in dry-plate work; but with the second batch of plates I was not so fortunate, and this failure induced me to attempt to prepare gelatine plates myself. Following in the tracks of Dr. Maddox and his disciples I made trial of various proportions of gelatine in solution with ammonium or potassium bromide and sensitised by equivalent weights of silver nitrate; but, though I succeeded in getting sensitive films and a bright image with a very moderate exposure, all my negatives at this stage were useless, because the nitrates with which the emulsions were loaded crystallised out on the surface of the plate, and covered them with a web of seams and scars. I then tried a plan recommended by Mr. Sutton as likely to succeed, and having obtained my bromide of silver by precipitation from aqueous solutions I added it to my gelatine solution; but the result, possibly owing to my want of skill, was worse than the original failures—the mixture refused to emulsify properly and the images were feeble and fogged.

While thus perplexed I happened to remember that the process of dialysis would separate crystalloid from colloid bodies, and having Griffin's *Chemical Handicraft* by me I consulted it. I had had no previous experience with the process myself, so I was startled to find that twenty-four hours were spoken of as the time necessary for an operation; and as gelatine was a substance with the peculiar properties of which I was little acquainted I mentioned the matter to Professor Liveing, and asked his advice. He told me at once that dialysis would serve me, and that four or five hours' diffusion would do all that I wanted. He also kindly explained to me the uses of the apparatus, lending me one of his own to begin experiments with. After one or two trials with a makeshift dialyser, which I contrived out of a wide-mouthed bottle, and with which I cleared the remains of some old emulsions which I had by me to my entire satisfaction, I dialysed an emulsion made as follows:—Forty grains of gelatine were soaked in fourteen drachms of distilled water for four or five hours. Solution was then effected by heat, and twenty-one grains of potassium bromide were added to the dissolved gelatine. Thirty grains of silver nitrate dissolved in one drachm of distilled water, to which, after solution, three drachms of rectified alcohol were added, were placed in a glass vessel, and the warm bromised gelatine was poured in a slender stream into the silver solution, the mixture being stirred actively with a glass rod. The resulting emulsion, which had a slight opalescent tinge, was poured into the dialyser, and submitted for about four hours to the action of common spring water at a temperature of about 100° F. to begin with, the apparatus being placed near a fire so that the gelatine might not become chilled during the operation.

Plates coated with this emulsion, which was milk-white, dried during the night, and in the morning showed no signs of crystallisation except about the thickened edges. Tried in the camera they were about as sensitive as the Burgess plates, gave fair printing density under alkaline development alone, with good details and freedom from fog.

I do not think that the proportions I have given are the best possible, but I have not been able to carry on any experiments with a view to modify them; and as the formula has given me good plates without a failure, as far as sensitiveness and brightness are concerned, I do not complain of it. I ought, however, to confess that I have sometimes been troubled by the film blistering and leaving the glass at the edges during development, and that I am somewhat at a loss to account for this mishap.

There can be no doubt that the tendency to blister will be found if the plates are developed before they are thoroughly dry, and the remedy is then obvious; but I have also remarked it in plates where the films were apparently in excellent order, and it has puzzled me greatly.

In such cases the blistering commences in, and is almost entirely confined to, portions of the plate either protected by the rabbet of the slide from the action of light or exposed to its feeblest radiations; and I have found it a good plan to mask the negative after exposure, leaving a margin uncovered, and in that condition to expose it to strong light, which is tolerably effectual. This, however, is but a makeshift expedient, and I only mention it because it involves a question which is worth investigating with reference to the properties of gelatine, viz., whether the light acting on gelatine in combination with the haloid salts of silver does not in some way affect the tendency of that substance to absorb water.

I was at one time inclined to think that if the gelatine mixture become too much concentrated by evaporation this disposition to blister is developed, and that a reduction in the initial strength of the solution would be a safe modification; but the few experiments I have had time to make have not confirmed this view. At all events, the difficulty appears to be purely mechanical; and though it has embarrassed me I have no fear that the remedy will not be forthcoming as soon the cause of the defect is ascertained.

It seems unnecessary for me to trouble you with any elaborately-detailed account of the method I use for coating and drying the plates. There are manipulatory difficulties to be met in coating which will suggest themselves to every operator; but they are more formidable in theory than in practice, requiring a little knack and neatness to overcome them, and yielding readily to patience and perseverance. I use a glass rod to enable me to get an even film, and place the coated plates on a level shelf till the films are sufficiently set to allow the glasses to be reared up without disturbing the evenness of the coating, which takes some hours. I then tried drying in a box fitted with horizontal grooves about half-an-inch apart, into which the plates were slid ten minutes or so after coating, and on the bottom of which I placed a saucer of chloride of calcium; but I found that the evenness of the film was destroyed by the imperfect level of the plates in the box, and drying was a very slow process indeed. Still I think that something of the sort might be devised, and the matter might usefully exercise the ingenuity of the numerous practical men to whom we owe so much of the compactness and efficiency of our present apparatus. The box must be of rather large dimensions; but it might be utilised as a packing-case when not employed upon its proper functions.

Having now described my method of working, which is manifestly open to the objection that the coating and drying of the plates is a difficult matter when compared with the analogous operations in the collodion processes, I must endeavour to show that there are advantages in the plan which more than outweigh these drawbacks. And first I would beg to impress upon you that you are not asked to decide that gelatine is entitled to *supersede* collodion; all that I wish to establish is that, under certain circumstances, gelatine may be used with advantage as a substitute.

The wet process will always hold its own in the studio; and there seems to be a strong reaction in its favour for field-work among the most distinguished landscape photographers of the day. Still there is a charm about dry-plate work which will assert its influence; and, though commercial dry plates will continue to find customers, it is fair to infer that there will always be found a band of enthusiasts to whom the labour of preparing their own plates is one of love, or whose pursuits carry them into regions where they are thrown upon their own resources for the materials with which to prosecute their art. To these, I think, such a process as I have described may prove acceptable. To them it will matter little whether pyroxyline be intense or not, whether collodion be powdery or skinny, whether washing water be pure or foul; a tea-kettle, a tumbler, and a damp towel will distil as much water as they require in a few minutes, and a packet of gelatine will be all that they will have to carry, in the place of that dangerous travelling companion, the ether bottle.

Not only will the *impedimenta* of the gelatine worker be lighter and simpler than that of his fellow-labourer who prefers collodion, but it is rational to suppose that the quality of his work will be more uniform—every plate which he prepares will be exactly like every other one of the same batch; whereas a small difference in the time in which the collodion plate has been in the washing water or the organifier will often alter its character materially, independently of the fact that the rapid evaporation which is inevitable in hot climates forbids the hope that the last plate shall be as the first. I wish I were able to lay before you a series of plates which would worthily illustrate the process, and show that in point of technical excellence gelatine negatives are not to be despised, but I have not had the time or opportunity for negative-making since the weather became propitious. Of those which will be laid before you, one only, taken early in January last, is worthy of notice; and it is not put forward as a specimen picture or remarkable for well-timed exposure and happy development. It will, however, serve to show the characteristics of gelatine work, which seem to be softness and delicacy of detail. I would also draw your attention to a batch of failures, to each of which I have appended a note suggesting a cause and a remedy. If any members of the Society who have experimented with gelatine can verify my observations, or indicate their error where I have come to wrong conclusions, I think the work of those who come after will be simplified.

The only novelty I have imported into the process is the use of dialysis, to which I was driven in my endeavours to get rid of the nitrates which are produced by double decomposition; and I am prepared to be met by the objection that I am not obliged to have recourse to double decomposition in the gelatine solution at all. Mr. Sutton, who advocates what I may perhaps be allowed to call the indirect method of sensitising an emulsion, defends his plan on the ground that he gets rid of "double decomposition within the emulsion itself, with all the attendant evils of that method."

I do not rightly understand in what the perniciousness of double decomposition consists. In the wet process the film is charged with iodide or bromide of silver by direct double decomposition in the bath, and no evil results accrue, so far as I can see. Why, then, should the same agency be condemned in an emulsion process, when all the obnoxious results can be removed afterwards with little care and no trouble?

I will assume that an emulsion can be made by precipitating bromide of silver from aqueous solutions, washing it and mixing it with gelatine, equal to that which is obtained by dialysis. What advantage has the former over the latter? The preparation of the bromide of silver requires time and care. It is very liable to be attended with considerable waste, and in the end the success of the operation will depend greatly upon the energy with which the pestle and mortar have been worked; whereas, by promoting double decomposition in the gelatine as I advise, no difficulty whatever is found in procuring an emulsion of unimpeachable quality as regards absence of granulation, and neither skill nor strength are required for the simple operation which removes the obnoxious nitrates.

I must admit that my method may take a little longer; but as it does not demand fixed attention while the dialyser is in use there need be no waste of time.

I have not tested my emulsion for free nitrate or free bromide; but I imagine that when it is dialysed it is to all practical purposes neutral, as diffusion has abstracted all but a trace of the free salts.

The proportions of potassium bromide and silver nitrate which I employ are, as you will observe, nearly in the ratio of their chemical equivalents. One emulsion which I made with an equivalent weight of ammonium bromide seemed to be much less sensitive than that with potassium; but whether the difference was real or only apparent, owing to unfavourable condition of light, I cannot say, as I did not repeat the experiment.

I have reason to believe that the plates will keep well; but special care must be bestowed on plate-cleaning if they are to be preserved. In proof of this I would call your attention to a stain on a plate exposed four months after preparation, where the mark of a pneumatic plate-holder, used in India two years before, is plainly visible, though the plate had been used and cleaned at least a dozen times in the interim. The metallic marblings visible on the same plate I am disposed to refer to an abnormal reduction of the silver salt in the film, caused by a leakage of gas into the room where the plate-box, which was not air-tight, was kept. The plates are fairly free from blurring; and I use no backing with them, as I think that they are not liable to that form of blurring which is caused by reflection from the back of the plate.

I have said nothing about the development of the plates, as I think each worker has a method which answers well in his own hands, and that he will find no difficulty in adapting it to gelatine films. The only stumbling-block is the blistering to which I have alluded earlier; and the cause I believe to be, generally, moisture in the film. For the more subtle variety which I have indicated I cannot at present prescribe; but I trust that its origin will be discovered and its occurrence obviated, if the experience of successful gelatine workers be placed at your service.

As regards the keeping qualities of the emulsion I can say but little. I have kept it a month in cold weather without any change taking place, and the quality of the plates prepared respectively at times separated by that interval has been identical.

I do not think there is any other point in my formula which requires explanation, unless it be the addition of alcohol to the solution of silver nitrate. I adopted this addition upon the recommendation of a gentleman signing himself "Ostendo Non Ostento," who wrote on the process in THE BRITISH JOURNAL OF PHOTOGRAPHY last autumn; and I find that I can get a fine emulsion, free from clots, more easily when I use it than when I substitute water. I cannot trust myself to explain what I regard as a fact so as to satisfy those whose knowledge of the mechanical condition of the alcoholic solution may convict me of empiricism; but if precipitation be to some extent retarded by the different density of the two menstrua I venture to submit that I am justified in believing that the precipitate is more finely divided.

In conclusion: I need hardly remind you that, in dealing with subjects in which physical science is the arbiter, I am venturing into a region which the feet of the uninitiated can hardly tread without stumbling. I must therefore beg you to excuse the crudity of my opinions on the ground of inexperience, and to pardon the length of these remarks in consideration for the garrulity of an enthusiast.

JOSHUA KING, M.A.

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE concluding meeting of this Society for the season was held on Thursday, the 11th instant,—the Rev. F. F. Statham, F.G.S., President, in the chair.

The subject for the evening was a demonstration of the new method of reproducing negatives by means of a dusting-on process; and, after a few remarks by Mr. G. W. Simpson on the theory of the process,

Mr. WRATTEN, from the establishment of Mr. J. Solomon, Red Lion-square, gave the demonstration in question, making in the course of it several practical observations. Two negatives were reproduced—one being that of a portrait, and the other of an engraving. The sensitive mixture with which the plates were coated was composed of—

Dextrine	¼ ounce.
Grape sugar	¼ ,,
Bichromate of ammonia	¼ ,,
Water	½ pint.

The exposure was made by means of the magnesium lamp, lasting for two and a-quarter minutes, and consuming about three feet of ribbon. Five minutes of diffused daylight would, in Mr. Wratten's estimation, be about the equivalent time.

A vote of thanks was awarded to Mr. Wratten for his demonstration.

Mr. B. J. EDWARDS advocated the use of bichromate of potash with the addition of a little ammonia as a substitute for bichromate of ammonia.

Mr. SIMPSON observed that the resulting double neutral salt thus formed was analogous to the other in solubility and sensitiveness.

Mr. FRANK HOWARD exhibited some negatives he had reproduced by the plumbago process. He adopted the method described in the journals by Mr. Woodbury, substituting ordinary white sugar for the glucose recommended. The graphite used by him was obtained by pounding in a mortar the lead of an ordinary pencil.

Mr. EDWARDS said that he had found the process useful for strengthening negatives, as well as for obtaining a duplicate negative at the back of a thin one for giving the softened effect which had been described as produced by printing from two negatives. In illustration of this he exhibited two prints—one from an untreated negative, the other from the same negative after it had received the duplicate on the back. This was unanimously regarded as very satisfactory.

Among the articles exhibited were a plate-holder by Mr. Wilkinson, and a plate-vice by Mr. Tully.

The President gave his annual invitation to the members to meet at his house on the evening of the last Saturday in July, after which the meeting was adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

An excursion of the above Association took place on Wednesday, the 10th instant, but, owing to the unpromising state of the weather at the time of starting from Liverpool, there was not so large a muster as there otherwise would have been. Those that did go, however, were rewarded by having a splendid day, the only drawback being the wind, which was rather too strong for photographing, except in the more sheltered positions.

Arriving about half-past ten at a village with the almost unpronounceable name of Rhydymwyn, the party were joined by Mr. W. Harding Warner, from Denbigh, who had kindly volunteered to act as guide to the party.

Proceeding at once up the valley of the River Alyn, Mr. Warner made a halt at a spot where a rustic bridge crossed the stream, and where several charming "bits," both for single and stereoscopic plates, could be obtained. Keeping on the right of the river and up the hill a splendid view was seen, with Moel Fammau in the distance. Here the long-focussed lenses were brought into requisition, and the party separated—those with small cameras keeping along the course of the river, which for some distance was nearly dry. Arriving at a bridge with a peculiar arch, and where the water of the river disappears under one end of the bridge instead of running through, the members again joined forces. By this time the wind had increased too much for work, and the fresh air having sharpened the appetite it was deemed necessary to seek refreshments. A walk was therefore taken up the hill to the village of Cilcen, which, owing to it being market day at Mold, was found almost deserted by the inhabitants. After a fruitless attempt at one inn, another was found bearing the sign of the "Lion;" but here the landlady was also absent, and the happy-looking daughter of the house was doubtful whether anything edible could be supplied. With blank looks such inquiries as the following were made:—"Have you any ham?"—"A frying-pan?" "Fire?" "Can you cook?" &c. "Yes!" "Then, here we'll stay!" Cameras were at once deposited, and with a speed that would have done credit to Prussian Uhlans some foraged the village for eggs, while others cut the ham and prepared the table. In a very short time an excellent repast was prepared, which was rendered all the more enjoyable by the jokes passed on the skill of those members who had so efficiently performed the duties of assistant cooks to the amused and astonished hostess.

It was evident that plates well coated with a substratum of fried albumen, chloride of sodium, pig, and a good home-brewed beer preservative was a process which could be well recommended to all photographers tired of working the usual dry plates.

A visit was paid to the church, which, though having no pretensions to external beauty, contained a most magnificent roof of carved oak, said to have been brought originally from Basingwerk Abbey at the time of the dissolution of the monasteries. Unfortunately sufficient time could not be allowed for the exposure of a dry plate, otherwise a stereoscopic view of so fine a relic would have been an acquisition.

Returning by the banks of the Alyn the cameras were again brought into use until the time arrived for the departure of the train. After bidding "good bye" to Mr. Warner, all agreeing that a most delightful day had been spent, the photographers returned to Liverpool, where they arrived about half-past eight o'clock.

Correspondence.

Exhibition of the Photographic Society of France.—The Hygiene of Photography.—Canon Beechey's Experiments and the Rationale of Them.

The exhibition of the Photographic Society of France, now open in Paris, in the *Palais de l'Industrie*—the first which the Society has held since 1870—is said to be a remarkably good one. Never, says M. Lacan, have French photographers worked with greater zeal and success than since the period of their country's disasters. Amongst the exhibitors there are few who do not illustrate by their specimens some new invention or improvement in the art. There are photopolychromes by Vidal; Lambertypes; proofs in printing-ink by the processes of Geymet, Thiel, Hermagis; Neôleo-peintures by Puttemans; heliographs from nature by Rousselon; and the ingenious process of Rodrigues applied to the copying of maps. At every step some novelty is encountered, or, in place of it, specimens which show by their admirable execution an advance both in taste and manipulation. We are promised shortly a review of the exhibition from the able pen of the Comte de Courten—a gentleman with whose name, both as a writer and a worker, my readers are already familiar. Here I may mention that he is now an *associé* of Signor Bava, who has an establishment of photolithography in the Place St. Marc, at Florence, and that he has presented a specimen of their work to the *Moniteur* of the 1st inst. It is a copy of an engraving of the *Femme de Valence*, by Gustave Doré, and is remarkable for the sharpness of the lines and the general fine quality of the work.

Dr. H. Napias has commenced a series of articles in the same journal on the hygiene of photography, in which he appears to be dealing very rationally and practically with those special influences which photographic operations exert upon the health. The vapours of ether and alcohol in the dark room, inhaled during many successive hours, are said not unfrequently to produce vertigo, sickness, indigestion, loss of appetite, sleeplessness, and, in some cases, a cerebral excitement resembling drunkenness. As a remedy for these evils the good doctor recommends total abstinence from alcoholic drinks—more especially vermouth and absinthe—and recommends in their stead lemonade, seltzer water, or sugared water, to which are added a few drops of vinegar and ammonia. But above all things he advises a stroll in the fresh air after the day's work, and to ventilate the laboratory as perfectly as possible.

He has also a word or two of good advice to those artists whose occupation it is to spend many hours at a stretch stooping over their work of retouching and straining their eyes. With these gentlemen, and ladies also, "plumbago on the brain" is becoming a common disease, and the doctor deals with their case very sensibly and feelingly.

He will be discussing next, I suppose, the effects produced by the careless handling of dangerous poisons; and I will take care to keep our friend the "Peripatetic" (who tells us that he has been dabbling lately in a deep basin filled with a strong solution of cyanide with a cut finger) posted with the doctor's remarks. In the meantime it may be worth his while to consult Dr. Alfred Swaine Taylor's work on poisons, in which, speaking of cyanide of potassium, he says that extreme caution must be observed in the use of it. In *Medical Jurisprudence*, by the same author—a copy of which is now before me—he says, at page 171, that five-sixths of a grain is the largest quantity that an adult man can take with safety, and that a dog was killed in a few minutes by three grains.

Our reverend friend, Canon Beechey, in his letter at page 272, brackets me with Mr. M. Carey Lea as a couple of voluminous correspondents who fill the sheets of this Journal with experiments and discoveries made by others long before, through not reading what others write in it! To Canon Beechey is, no doubt, due the honour for which he contends of having been the first to point out the advantage—whatever that may be—of dipping an emulsion film containing free nitrate into a bath of organifier; but so far from *my* not having read of this, I have often wondered what the true explanation of the experiment might be, and have even alluded to it in print. This being the case, I must beg of the reverend Canon kindly to remove my name from the companionship in which he has placed it. If he will but "cudgel his brains" a little, or refer back to a letter of mine in this Journal at the period of which he writes, he will find that I not only tried ale as a preservative, on his advice, but also succeeded with and recommended it as giving good results. After this it is "cruel hard" to be charged with not having read his articles.

The explanation of his experiment appears to me to be this:—An emulsion film containing free nitrate is plunged, without any washing, into a bath of preservative (containing, say, tannin or pyrogallic acid) and is not discoloured by the treatment, and gives a bright negative with the alkaline developer. Why is this? The fact appears to contradict all our previous knowledge deduced from experiments. For instance, if we pour a tannin preservative over an imperfectly-washed film of bromide or bromo-iodide of silver which has been excited in a bath it is reddened immediately; and if we add some alkaline developer to any kind of preservative containing free nitrate of silver it is darkened immediately (unless that preservative be intensely acid). How, then, are we to explain the fact described—of the truth of which there cannot be a doubt, because it is so well attested?

The explanation seems to be this:—The unwashed emulsion film is intensely acid, from the presence of free nitric and unconverted hydrochloric acids, and those free acids hold in check *for a time* the reduction of the free nitrate when it is brought into contact with the tannin or pyrogallic acid in the organifying bath. My readers have only to be reminded that the old calotypists used to excite their iodised paper by brushing it over with a mixture containing gallic acid and aceto-nitrate, and that neither the mixture nor the paper became discoloured during the process, although the latter would not keep good for more than a single day. Acid holds in check for a time the reduction of silver nitrate by a deoxidising agent, as we all well know to be the case in the common wet process, and that is why the acid emulsion film keeps clean when it is dipped in the organifying bath.

But we must remember that the organifying bath not only washes out of the film the nitrate of cadmium, but becomes contaminated with the traces of free nitrate of silver which are transferred to it by every plate immersed, and must, therefore, become rapidly deteriorated by use. In this way large quantities of bath must be wasted by the immersion of a very few plates, and the mode of proceeding must, I should think, be a very injudicious one, even assuming it to answer well for the first few plates immersed. Besides which, as I shall endeavour to prove next week by reference to experiments which leave not a shadow of doubt on my own mind, bromide of silver is rendered *less* sensitive instead of *more* sensitive by being exposed in presence of free nitrate of silver, or of a mixture of silver nitrate with organic matter. What is true of *iodide* of silver in this case is *not* true of *bromide* of silver. The true reason why a large excess of free nitrate of silver in the *emulsion* gives very sensitive plates is because it ensures the nearly complete conversion of the bromide of cadmium; but these highly-sensitive films yield negatives which are thin and difficult to intensify.

I cannot agree with Mr. Stillman that there are any special difficulties in the way of comprehending the theory of the emulsion process. The theory of the bath process seems to be equally applicable to an emulsion film, and the key to them both, as regards sensitiveness and density, is the quantity of unconverted soluble bromide left in this film. To suppose that in either case this can with impunity be reduced to zero, or that increased sensitiveness can be got by means of free nitrate, or silver nitrate combined with organic matter, is, I am persuaded, an entire mistake. It is also quite certain that, if any silver nitrate remain in the film at the time of pouring on the alkaline developer, general discolouration must result.

Questions of this sort should be freely discussed in a journal, and no one should be offended at finding his own peculiar theories or modes of operating brought under criticism; for one great purpose of a journal like the present is to afford an open arena for the fair discussion of such questions as I have now ventured to treat, and all that the reader has a right to demand is that the arguments on both sides be conducted with courtesy and a scrupulous regard to truth.

June 12, 1874. THOMAS SUTTON, B.A.

BEER AND ALBUMEN DRY PROCESS.

To the EDITORS.

GENTLEMEN,—Mr. W. H. Davies, in his communication to the Edinburgh Photographic Society, printed in your last number, has, I venture to think, in claiming priority of invention for his "beer and albumen" process over Captain Abney's under the same title, fallen into a total misapprehension of its nature, and scarcely gives sufficient credit to Captain Abney for originality.

Led away by a pardonable parental fondness for his own child, Mr. Davies does not recognise that there is a wide difference between the two processes, though "beer and albumen" are equally ingredients in each. In speaking of Captain Abney's process he treats it as "somewhat different" from his own in the "details of the process," whereas if carefully examined it is an essentially different method. Mr. Davies's preservative is "ten ounces of ale," with from "ten to five grains of nitrate of silver [by no means an inert material], the white of *one* egg, and twenty grains of gallic acid"—a somewhat dilute albuminous mixture. Captain Abney's preservative has *no nitrate of silver* in it, and consists simply of equal parts of beer and albumen with ammonia—a tolerably strong albuminous mixture—and not four ounces, by-the-by, of albumen to five of beer, as Mr. Davies fancies it is.

Captain Abney washes off his preservative under the tap, and then gives a final wash of beer and pyrogallic acid—one grain to the ounce. Mr. Davies leaves his preservative to dry untouched, and without any final wash. These, to my mind, are details more than "somewhat different"—in fact, constituting another process.

Mr. Davies's plates keep after exposure two or three weeks only. Captain Abney speaks positively of the keeping quality of his plates up to two months *between exposure and development*—how much longer he cannot say; but he nowhere limits the general keeping quality of the plates previous to exposure, as Mr. Davies seems to think when he contrasts it with that of his own.

I have not tried either process, and can say nothing of their relative merits; but I have great faith in the value of albumen in any negative process. I have no doubt that good results can be obtained by both processes.—I am, yours, &c., P. LE NEVE FOSTER.

June 15, 1874.

OLEATE OF SILVER IN EMULSIONS.

To the EDITORS.

GENTLEMEN,—On reading over my communication on the oleate of silver in emulsions in your last number, I find that, after adding the bromide of cadmium solution to the emulsion containing excess of silver, I say "let stand an hour or so."

Now this unlucky, loose way of expressing myself may mislead some experimentalists and deter them from further trial of this modification (especially those who wish to get over the trouble of preparing the pellicle as soon as possible), for if the bromide solution is not allowed sufficient time to act on the free silver in the emulsion the result will be foggy plates. Instead, therefore, of the very indefinite "hour or so" I should have said that at least four to five hours should elapse before filtering, adding the glycerine, and pouring the emulsion out to set. The following is the formula of the collodion I used, and which I have found very good for general emulsion work:—

Ether	6 drachms.
Alcohol	2 ,,
Double bromide of cadmium and ammonium	5½ grains.
Chloride of calcium	1 grain.
Nitrate of uranium	30 grains.
Pyroxyline ... according to quality.	5 to 6 grains,

This formula may not be the best for the oleate modification, but I have found it to answer well.

I intend experimenting further in this direction, and should I find another formula as good or better I will send it to you.—I am, yours, &c., JOHN B. C. FOX.

Lutterworth, June 15, 1874.

ON ENGINE PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—This is, as many of your readers are aware, a very important and greatly-increasing branch of many a photographer's business at present; and having had some experience in it, I purpose giving a statement of the mode of procedure adopted by myself with great success, and which I can recommend to any of my photographic brethren who may feel disposed to follow it out for their own satisfaction, and also for the satisfaction of the engineer engaging their services.

I made up a new bath of the strength of thirty grains to the ounce, and, after iodising and acidifying, tried a small plate in the studio to make sure of its being in good working order, and that being so proceeded to mix up the other necessary chemicals.

Having the photographic van ready for the reception of the working plant, I ran through the list of things requisite, beginning with the plates, so as to be sure of not going away and, on arrival at the scene of operations, finding myself accompanied by the bath *minus* the dipper, a camera and lens *minus* the stand, and so on. Having all ready I packed everything securely and drove off some five or six miles to the works of the engineers, and on arrival began to rig up for working 12 × 10 plates.

The locomotive was drawn out on a line of rail in the company's yard. I then got a man to distribute a couple of buckets of white lime underneath and round about the engine, thus reflecting a good light up, and showing every bolt and screw in the under gear with distinctness, and by that means the resulting negative was much finer than otherwise could have been obtained.

Having pitched the camera at the best point of sight, and levelled it with a spirit level, I polished and dusted a plate, and, using collodion which had been iodised about two months, sensitised the plate. Seeing that the holder was thoroughly clean and slide working freely I inserted the plate, backing it with a piece of red blotting-paper moistened with water and pressed into *close contact*, also laying a strip of blotting-paper in the groove at the bottom of the slide to soak up the silver dripping from the plate, and for the prevention of "wood stains." Returning to the camera I focussed, stopped down very small, thus obtaining great depth and minute sharpness. I developed with a solution made up as follows:—

Sat. sol. ammonia-sulphate of iron	3½ ounces.
Glacial acetic acid	6 drachms.
Gelatine solution	2 ,,
Water (pure soft)	30 ounces.

Having brought out all details, and well washed, I intensified with the following solution:—

Pyrogallic acid	30 grains,
Citric acid	5 ,,
Water (pure soft)	18 ounces,

adding a ten-grain solution of silver, and fixing with a saturated solution of hyposulphite of soda as being quite as effective and far less dangerous than cyanide in working at a high temperature, again washing thoroughly for about five minutes. I then flooded with a weak solution of gum arabic to prevent the negatives from splitting in the drying or leaving the plates in any way whatever, and placed them standing on blotting-paper to dry free from dust. Having completed the day's work after the manner described I carefully put the negatives (sliding them in on their backs) into a clean and smoothly-grooved plate-box, previously laying a piece of blotting-paper at the bottom for the moisture to drain into, and varnished them on my reaching home, placing them in a rack ready for being printed from on the morrow. And now as to their printing.

The sensitising bath was sixty grains to the ounce, slightly acid, using a Rive's paper possessing a good body of albumen and floating three minutes, drying before a gas fire slowly (the gas fire is best, as it gives no dust), and afterwards straightening in a portfolio between yellow blotting-paper—thus keeping it flat, and ready for use at any moment. Taking the negatives one by one I blocked out everything in the background with Bates's black varnish, and, tracing carefully round the outline of the engine with red colour laid on with a small brush, allowing time to dry, and warming the pads of the printing-frames, I printed each picture to the desired depth; afterwards flattening, by exposure to sunlight for a few seconds, the white ground (made so by the distributed white lime), thus avoiding too much contrast, and being fully repaid for extra trouble in the prints being so much nicer.

I toned with the acetate bath, obtaining a nice warm sepia tone, and, after washing well, made up a solution of hypo., four ounces to the pint, fixing for ten minutes; then came thorough washing in three waters, allowing the prints to remain in running water for some five or six hours. I then hung them up to dry, cutting when dry, and mounting on buff-coloured mounts, having a red line for the enclosure of the picture, using for that purpose freshly-prepared starch. I placed a piece of common note-paper over the face of the prints, and rubbed them down by means of a putty knife, rolling and spotting-out all little defects, with which operation the work was finished, being eminently satisfactory to all concerned.

A word or two about printing copies of engineers' plans. Instead of printing them on albumenised paper try the effect of printing them on salted paper, floating it on a sixty-grain bath for eight minutes. You will obtain a *facsimile* of the original drawing, the surface being slightly porous and "dead," like drawing-paper, instead of glazed, which will be found to be more acceptable to the engineers, who like exact copies of their work, faithful in all points.

If anything I have written may help any follower of our beautiful art in the production of good work in this direction, my purpose will be fully answered.—I am, yours, &c., HARRY HALLIER.

Liverpool, June 8, 1874.

EXCHANGE COLUMN.

An $8\frac{1}{2} \times 6\frac{1}{2}$ changing box, holds twelve plates, with camera complete, to take one, two, or four pictures on whole plate, is offered in exchange for good magic lantern with four-inch condensers, gas jets, and slides; or open to offers.—Address, J. H. T., 97, Manchester-road, Swinton, near Manchester.

ANSWERS TO CORRESPONDENTS.

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

QUERIST.—The colours are obtained from coal tar.

F. J. W.—We are glad the difficulty has been overcome.

T. B. J.—We regret we cannot report favourably on your productions.

GEO. M'ADAM.—Cover the pictures with the purest crystal sheet glass that can be obtained.

COLONEL GREY.—We are very well acquainted with the tent, and are much pleased with it.

F. R. S.—The proportions are these:—One grain of nitrate of uranium, one grain of citric acid, and five grains of nitrate of silver.

PRINTER (Leeds).—There is no objection to your method of working; but we should advise you to wash the print thoroughly before fixing.

REV. B. R. GRANDISON.—The precipitate in the packet marked No. 1 consists of metallic silver; that in the other parcel appears to be oxide of zinc.

T. J. F.—You have evidently exposed your gelatine film to the light under the negative before it had been thoroughly dried. Dryness of the sensitive surface is essential to success.

"No. 90."—From the few words of your close and damaged writing on the back of the postcard which we have been able to decipher we imagine that your difficulties will cease if another sample of varnish be used.

SEL D'OR.—The cause of the red stains upon applying the tannin to the plate is the presence of nitrate of silver in the film. Remove the silver by a thorough washing, and you will not again experience an annoyance of this kind.

EUSEBIUS.—A good 12×10 negative of subject No. 1 will be worth about £5; one of No. 2 about a guinea, while one of No. 3 would be worth a very large sum on account of the great cost at which it would necessarily be obtained.

AMATEUR (Kerry).—1. From the direction of the markings and spots we infer they are caused by the developer rather than by the collodion or the bath. Carefully filter before again using it.—2. Protosulphate of iron will rapidly become peroxidised after it is dissolved in water. For intensifying we cannot add anything to what was said in the ALMANAC. Citric acid will not keep long good in solution.—3. By "pyrogallol" Mr. Sutton means pyrogallic acid.—4. The bath with a number of divisions for the preparation of dry plates, as described by you, will be very handy.

A POOR PHOTO.—Of the various works on optics mentioned by you, the one by Coddington is the best. But it is very far from being what may be termed a "popular" work, for, unless you are a mathematician, you will not understand it.

STRICHNINE.—The pictures are fair; but they are all slightly defective in consequence of the right sides of the sitters being rather too dark. This may be remedied by hanging a light-blue curtain to act as a reflector instead of the black one.

JAMES HUNTER.—If you apply to an operative chemist instead of to a mere druggist, you will obtain the salt wanted. You may, however, try again, but you had better, when inquiring for it, adopt the *alias* of "Schlippe's salt," by which name the sulphantimoniate of sodium is better known than by its more correct designation.

OLD FOGEY.—Summed up in the fewest possible words: in the negatives having a claret tone the atoms of which they were composed were found to be smaller than the others. A compound microscope, quite good enough to show the granules of which the deposited silver consists, may be obtained for eight or ten shillings.

RUSTIC.—1. There is no *objection* to the use of a substratum for gelatine plates except this—it is not required.—2. See in our ALMANAC an abstract of a paper read by Mr. Foxlee at the South London Photographic Society last year, in which you will find the process you are working fully described. Mr. Foxlee developes the negative on glass instead of on paper.—3. Distant views may be photographed by means of a telescope.

CHARLES S. CALDER.—As we never contemplated placing the series of lessons on photography, given in the ALMANAC for 1873, in antagonism to those published in any of the existing manuals, it is scarcely in good taste to ask us to state whether our lessons are better or worse than those. The best thing for *you* to do is to obtain that ALMANAC (if you can) and also the manuals advertised in our pages. Read and study them, and you will never regret the mental excercise.

FANNY.—Collodion positives can very easily be transferred to leather cloth in the following manner:—To an ounce of methylated alcohol add three drops of nitric acid, and pour sufficient of this on the picture to wet it thoroughly. Also make the surface of the leather wet with it, and then lay the leather, face downwards, upon the picture, taking care that no air-bubbles are allowed to intervene. Allow them to remain in contact under pressure until they are dry, when the leather may be peeled away from the glass, taking with it the picture. There are other methods of effecting this transferring, as well as other material upon which to transfer the picture.

A PROFESSIONAL.—The method of producing the Vanderweyde stipple, described in our pages in 1872 by Mr. George Croughton, is said to produce quite as good effects as, if not rather better than, that patented, with this advantage—that Mr. Croughton's method is not fettered by any restriction whatever, and hence may be practised to the fullest extent without either license or special privilege. Mr. Sarony's method of producing Vanderweyde effects is also unpatented, and produces, in that gentleman's estimation, *better* results than those obtained by the original Vanderweyde process. It has already been described, and you may practise it to the fullest extent, fortified as you are by the opinion of one of the ablest counsel (in connection with patent law) in London.

LONDON PHOTOGRAPHIC SOCIETY.—We are requested to state that the new laws will be in the hands of members not later than Monday next, the 22nd inst., and a special general meeting for passing the same will be held at 9, Conduit-street, Regent-street, W., at eight p.m., on Tuesday, the 30th inst.

THE TRANSIT OF VENUS.—Mr. R. A. Proctor, Secretary of the Royal Astronomical Society, in a letter to *The Times*, calls attention to the fact that no special provision has been made for securing observations of the middle of the Transit—a phase which he considers to be of high modern importance. He goes on to mention Cape Town, where there is a Government Observatory, as possessing greater advantages for mid-transit observations than any of the stations hitherto provided for, and suggests that Mr. Stone, Astronomer-Royal at the Cape, should obtain photographs by both De la Rue's and Professor Winlock's methods. In comparing these two plans he states that American astronomers "consider that the European observers are making a fatal mistake in employing the Kew method," and proceeds to explain that, in addition to the necessity of a subsequent enlargement of the original photograph, "the most trustworthy determination of the scale of the picture is that made from the photograph itself, in which, however, the sun's disc may be made appreciably larger by irradiation." In Winlock's method, on the other hand, the image is produced by an object-glass of forty feet focal length, and requires no enlargement. The size of the sun's image being known beforehand, and not determined by measurement of the photograph, it is not subject to error from the effect of irradiation. He cites the adoption by Lord Lindsay of Professor Winlock's method as seeming to confirm this opinion.

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THE BRITISH
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No. 738. Vol. XXI.—JUNE 26, 1874.

CONCERNING THE DARK ROOM.

Dr. Henri Napias, who, it seems, has a large connection amongst photographers in France, is, in a series of articles in the *Moniteur*, giving his clients the benefit of the results of his observations; and, as the evils which he seeks to remedy are not altogether unknown on this side of the channel, we have no doubt his advice will be carefully considered by all concerned.

We fear, however, that the true hygiene of photographic operators will not be satisfactorily attained until photographers generally give more attention to the structure and arrangement of the dark room. We wonder how many of our non-professional readers have anything like a correct idea of the kind of place in which—not, perhaps, as a general rule, but in a very large number of cases—the sensitiser and developer has to do his work; and we are sure that if it were more generally known, the wonder would not be that so many have to retire through loss of health, but that comparatively so few require to give in on that account. We fear that in many cases too much attention has been given to the studio or glass house, and little to the laboratory in which the real work is done. Where space was limited the former has been expanded to the utmost extent —very often to a size quite unnecessary—while the latter has been squeezed into any corner, the constructor apparently satisfied if he had room to turn. We need hardly say that such an arrangement is not conducive to the health of the operator, more especially as in the majority of cases the question of ventilation has not been taken into consideration at all, and the few cubic feet of air soon become impregnated with the vapour of ether to such an extent as to render it quite unsuitable for the reoxidation of the blood in the lungs, the result being a feeling of langour and disinclination for exertion that too frequently leads to the temporary relief afforded by alcoholic stimulants. Englishmen have a dislike to anything that looks like an interference with the liberty of the subject, but we punish a poor wretch who tries to throw himself from London Bridge into the Thames; and we are not sure whether it would not be wise to prevent the kind of slow suicide which constant working in such a small room is in reality. Why should not our officers of health have power to say that the dark room shall not be less than $10 \times 10 \times 8$, or contain less than 800 cubic feet of air?—little enough, certainly, for a man who may have to work in it for six or eight hours at a time, to say nothing of two or three who are sometimes so employed.

Next in importance, perhaps, is the quantity of light admitted. This is of more importance for many reasons than is generally supposed; and we think that, as a rule, there is much too little admitted into the operating room, the question apparently being—How little can I manage to work with? instead of—How much can I safely use? the result too often being a single pane about a foot square, which barely lights more than a few feet of space in its immediate neighbourhood, leaving the rest of the room in darkness, and causing confusion and difficulty in the search for a missing bottle or anything which may be wanted. Photographers should bear in mind that it is not the quantity, but the quality, of the light that they should attend to; and that if it be sufficiently non-actinic the more they have of it the better. We think that in no case should the dark-room window be less than three feet square, and that there should be two sashes properly hung, so as to slide easily up and down. The outer one should be glazed with white glass, and the inner with a rather deep orange which, when examined with a prism, shows no trace of blue or violet; a third sash glazed with ruby would be an advantage, although not absolutely necessary. This would illuminate every corner of a room the size already indicated, or even larger; and, if the glass be properly chosen, could not fog the most sensitive plate during ordinary development.

Next comes the arrangement for ingress and egress, and this is in many cases very faulty. Probably the most objectionable form is the too common curtain, which, in addition to harbouring and distributing dust at every motion, becomes the receptacle of all kinds of chemicals —useful in their proper place, but injurious both to plates and lungs when sent floating in the atmosphere. We remember a case that occurred in Manchester many years ago, in which the head of a large establishment was at his wit's end to discover a remedy for ever-recurring stains on his prints, and we were applied to in order to discover, if possible, a remedy. We went and watched the proceedings of the assistants at every stage of the operation, and soon saw the cause of all the trouble. The dark room, which was a very large one, was separated from the glass room in which the printing was done by heavy curtains, near to which stood the solution of hypo. for fixing. The assistant who had charge of that part of the work was in the habit of wiping his hands on the curtains, and so they soon got charged with the salt. Then the assistant who handled the paper had to push aside the curtain as he passed out or in, and the hypo. thus communicated to his hands was, of course, the cause of the stains. The curtains were removed, a different arrangement substituted, and the stains appeared no more. Ordinary swinging doors are not much less objectionable, the rapid current of air they produce setting the dust in motion, and frequently causing pinholes and other objectionable blemishes which are generally ascribed to other sources. Probably the best and most convenient construction of an entrance—one that will effectually exclude light, and yet answer the purpose of an open door—is an arrangement of the labyrinth order, which consists of a screen placed so that the entrant has to turn twice at right angles before he gets in. This may be placed either outside or inside the room, and will be found very efficient. It thoroughly excludes the light, does not disturb the dust, and permits a constant exchange of air, while of course the operator can without trouble go out and in with both hands full, as there is no door to shut or open.

There is just one thing more that we would impress on operators generally, *i.e.*, much greater order and system in the dark room than, judging from many visits to studios in various parts of the country we have made, is generally the case. It does to a visitor really seem strange that, working with such active poisons as cyanide, silver, and pyrogallic acid, and with such necessity for keeping everything to its proper use, there should be so much apparent confusion in the arrangement of the bottles and so many of them without labels, or with labels manifestly meaning something very different from the contents. Of course there is always the ready answer—"No pen or pencil or gum handy at the moment;" and so the unlabelled solution is set aside, to be forgotten in a few days, and ultimately poured into the sink as unknown or doubtful. This excuse cannot longer be made, as we have received from Messrs. George Mason and Co., of Glasgow, a book of labels which they have just got up for the use of photographers. It seems to contain a label for everything needful in the dark room; and, as the labels are gummed and perforated, they are always ready when required. We heartily recommend this book to our readers, assured that its trifling cost will be repaid in the saving of a single bottle from the sink.

THE PUBLISHERS OF SCIENTIFIC BOOKS AND PHOTOGRAPHY.

We intend to devote a small space to the consideration of a branch of industrial art which is destined to supersede the woodcut and lithograph, and yet an art which, so far, may be said to have made very little progress in this respect. We firmly believe that we have just arrived at the period of events when the rubicon has been past and steady development must set in.

Since the year 1868, when Mr. Swan published the details of his excellent carbon process, no efforts have been spared to perfect and make practical the permanent processes. Few works of importance illustrated by photography had been published until within recent years, and those few generally landscape views and tourists' books. There was an uneasy feeling that such works, however beautiful, were evanescent. Expensive works of art we like to keep. The more excellent the picture the greater the regret to feel that its days were numbered, and that each year added to its deterioration. The regret is even greater when we inspect such works of art as those which emanate from the studios of men like Mr. O. G. Rejlander. Even such views as are contained in Mr. Thompson's beautiful volume on China might to a certain extent be replaced; luckily, however, they are autotypes. But is it fated that most of the strikingly-imaginative pictures hitherto issued are to pass away with their authors? Let all such in future be printed in carbon. "Imperishable prints," as we have said before, should be the cry of the public; and all photographers who wish to be beforehand with the public should devote their assiduous attention to this branch of their art.

Our object, however, is not at the present time to reiterate a question so plain, but rather to take time by the forelock and point out many suitable branches of illustration for works of a different class to Thompson's *Illustrations of China and Its People*—to suggest, in fact, a field which has hardly received any development as yet, and where the application hinted at is even more valuable.

The photographic art is particularly valuable in depicting the minute details so essential to science, and the cost of such works, as a rule, warrant the publisher in expending any reasonable amount in illustrations. But what need have we to talk of cost when we find that excellent carbon *cartes* can be issued in the penny periodicals! Already architects and engineers make constant use of photography as an invaluable adjunct in the pursuit of their profession, whilst its truthfulness and unerring faithfulness of details have been invaluable in law proceedings. Already so well is this recognised that photographic evidence is used in five per cent. of the trials, criminal and civil, which take place in our courts of law.

In works illustrating comparative anatomy, histology (science of organic tissues), microscopy generally, botany, and zoology, the photographic art must stand pre-eminently forward as superior to all other modes of illustration. Here not only the minutiæ of what can be detected by the eye, but the hidden mysteries that can only be revealed by the microscope, are all equally portrayed, and with unerring accuracy. The resulting books are of the class used only by the *savans*. Accuracy will always with such men outweigh the consideration of a few shillings in the price, and, therefore, every pains should be bestowed upon the production of the plates.

Photographic microscopy may be conveniently worked with the oxyhydrogen light or the magnesium light. The first-named method will, as a rule, be found sufficiently powerful to do all that is required, and is, besides, more convenient than any other. In taking a negative there should be an arrangement for holding slides containing specimens (histologic or otherwise) which can only be prepared temporarily, and must be photographed whilst spread out in fluid. The glass slide for this purpose must be horizontal—not perpendicular; but there is no difficulty presented by this peculiarity. It is only necessary to provide a properly-arranged framework and a mirror at an angle of about 45°. This mirror should be, however, movable, for a cause which we will describe farther on.

The fluid placed upon the slide may be varied with great advantage according to the refrangibility of the substance we are photographing. Thus, Canada balsam could not be used with starch granules; we must resort to water or, what is much better, castor oil to mount our starch before it will photograph. In fact, there is hardly any object that cannot be improved by judicious mounting. We have seen the most delicate test objects, as they are called, brought out with perfect accuracy of detail in microphotography. "Test object" is a term applied in microscopy to selected objects which will put to the test the magnifying, defining, and penetrating power of the object-glasses of the microscope. Now, it is evident that such objects will form a good criterion of the capabilities of microphotography for doing its work. Thus, the common insect called *Lepisma saccharina*, found running about the shelves of cupboards where sweets are kept, gives a scale covered with beautifully-delicate longitudinal markings, so fine that the greatest difficulty will be found in detecting their markings with bad glasses, and the relative merits of two instruments may be judged of by the clearness with which they come out. In photographing such objects great clearness may be obtained by sending the light through the objects a little obliquely. The definition does not, as a rule, come out so distinctly with perpendicular rays; hence the necessity for having the mirror movable.

We have lately seen some beautiful illustrations of the application of the photographic art to scientific works; but, unfortunately, most of them are not permanent examples. One or two splendid illustrations, however, we will mention. *Revision of the Echini*, by A. Agassiz, although not published in the ordinary sense of the word, is issued as a part of the series of catalogues of the Harvard College Museum of America. This is a magnificent specimen of what photography can do for science.

Another work may be cited as a fair example. It is a French book with a very long title, and is called *La Botanique de la Bible Etude Scientifique, Historique, et Litteraiel des Plantes Mentionnées dans la St. Ecriture, par F. Hamilton (Nice: E. Fleurdelys*, 1871). It is illustrated by twenty-five octavo photographs. The advantage of photography over all other modes of illustration for the works upon the sciences which may be aptly called descriptive is so evident that it is superfluous to dwell further upon the subject. The sciences which may be classed as descriptive are botany, zoology, mineralogy, which include vegetable and animal anatomy.

A very useful employment of photography would be to illustrate books dealing with chemical and physical science. The accuracy and striking effect got by photographing the complicated apparatus now used in some of the physical experiments must be seen and compared with the usual woodcuts in order to be appreciated. We have before us a work the illustrations of which were originally photographed, although afterwards engraved by the publishers. It is Professor Reynolds's *Short Lectures on Experimental Chemistry*. The clearness to the "mind's eye" of all the details is beyond comparison in favour of the photographs.

A few observations suggested by looking over this book may not be amiss. In photographing glass apparatus, &c., the background should not be too dark, but rather a light drab. A black background is a mistake. Perhaps an exception might be made in the case of graduated glass instruments, when the background should be dark, and may be brought close up to the instruments. If we now focus for the graduation it will come out beautifully distinct and clear. In representing chemical processes in operation the liquids in glass vessels may be tinged with advantage with a little tincture of turmeric, and the figuring for reference can be easily managed by having a set of letters or numbers cut out of black cardboard, which can be attached to the apparatus by a little gum water.

COMPLAINTS have recently appeared in this Journal respecting the scratching resulting from the use of the rotary burnisher, arising from the action of the hard surface of the albumenised paper when forced, under severe pressure, over the surface of the polished steel burnisher. The hardest steel, as we have elsewhere remarked, will become softened under the action of prolonged heat, and hence the necessity for substituting for steel something which should be equally hard and not liable to be scratched. In the highest class of mechanical actions—such as chronometer and watch work—gems are much used in preference to the hardest metals on account of their greater durability; and we thought that by selecting a hard specimen of stone to act as a burnisher instead of the polished metal the disadvantage of scratching would be overcome. With the view of trying such a substitute we have obtained a strip of agate of about half-an-inch in width, with a polished and rounded top, and quite straight and flat on the under surface. This, when placed upon an iron bed, admits of the application of a very great degree of pressure without fracture; and after several trials we have made with an agate of the kind described we are led to believe that it will answer much better than any of the metals or alloys hitherto used for this purpose. The price of a strip of agate is far lower than would have been imagined, and it does not seem to become friable when subjected to the degree of heat required for effective burnishing.

ON THE COMPARATIVE SENSITIVENESS OF IODIDE, BROMIDE, AND CHLORIDE OF SILVER TO WHITE LIGHT IN THE VARIOUS NEGATIVE PROCESSES.

IN an article at page 265 of this Journal I have endeavoured to prove by reference to experiments that of the three halogens—iodine, bromine, and chlorine—iodine has the strongest affinity for silver, bromine next, and chlorine least. I gave *two* distinct reasons for believing this—the first being derived from the fact that iodine displaces both bromine and chlorine from bromide and chloride of silver, and that bromine displaces chlorine from chloride of silver; and the second from the fact that a collodion film of iodide of silver is the *most* quickly formed in a nitrate bath, bromide of silver next, and chloride of silver least. To these I will now add three more which have occurred to me since; and I will insert them here, before proceeding to the main subject of this article, because the explanation of what is to follow is based upon the fact of the relative affinities of the three halogens for silver being as above stated.

Third Reason.—If we take collodion films containing respectively iodide, bromide, or chloride of silver, and wash them free from all soluble matter as far as possible, we shall find that (if they have never been exposed to light) the chloride film can be completely reduced by an alkaline developer so weak as not to affect the bromide film in the least, whilst that in its turn can be reduced by a stronger alkaline developer; but the iodide film cannot be reduced at all by an alkaline developer of *any* strength. This fact supports the idea that iodine has the greatest affinity for silver, and chlorine the least, even if it does not amount to absolute proof; for it must be remembered that the same result is obtained whether ammonia, soda, or potash be the alkali which is added to the developer.

Fourth Reason.—Iodide of silver is rendered quite insensitive to light by the presence of a very slight excess of iodide of potassium. But bromide of silver requires a *large* excess of bromide of potassium to render it quite insensitive; whilst chloride of silver will darken in the light under a *saturated* solution of chloride of sodium. (I believe the same result will be obtained if chloride of sodium be employed in all three cases, but I am not quite sure.)

Fifth Reason.—Iodide of silver combines very readily with nitrate of silver to form iodo-nitrate; but bromo-nitrate is far less readily formed, and it is doubtful whether chloro-nitrate exists at all. I need not remind my readers that an *iodide* of silver film will be dissolved if left many minutes in a new thirty-grain nitrate bath, whilst a *bromide* of silver film will *not* be dissolved if left for *a day or two* in a new *eighty*-grain bath. This again points to the fact of iodine having the strongest affinity for silver, and chlorine the least.

Putting all these five proofs together a strong argument has been made out in favour of my case. But, on the other hand, we read in an editorial article at page 276 of some experiments which seem to prove that iodide of silver immersed in an aqueous solution of chlorine is converted into chloride of silver. The experiments, however, were not made with a pure solution of chlorine, but one containing some other ingredients, so that the affinity of iodine for some of these other substances may have been called into play so as to vitiate the results.

Let us now proceed to the immediate subject of this article. The comparative sensitiveness to ordinary white light of iodide, bromide, and chloride of silver will depend upon the nature of the substance with which they are in contact when exposed; for we know nothing whatever about their behaviour when exposed *in vacuo* and out of contact with any other matter, nor does this case ever occur in the ordinary practice of photography.

Let us first, then, consider the case in which the three haloid salts of silver are exposed to light in contact with free nitrate of silver, the image being developed by acid pyrogallo-nitrate.

So far as I have been able to put their comparative sensitiveness fairly to the test under the above conditions, iodide of silver appears to be the most sensitive of the three, and chloride of silver the least; but all three will give good, bright, dense negatives when properly exposed, and they may be mixed in any proportions with a similar result.

Let us now see if we can explain this result by means of the relative affinities of the three halogens for silver. If we put into a test tube some iodide, bromide, or chloride of silver along with a solution of neutral nitrate of silver, and expose it to sunshine, shaking it well all the time, we find that the solution becomes strongly acid with free nitric acid, whilst the haloid silver salt becomes darkened. A chemical change has, therefore, taken place; and it would appear that the silver nitrate has been decomposed, the silver having combined with the haloid silver salt to form a new compound having a darker tint.

It is foreign to our present inquiry to discuss what this darkened substance may be, but I will give my views on that subject on another occasion, merely suggesting at present that it may be a sub-iodide, sub-bromide, or sub-chloride of silver, formed by the combination of three atoms of silver with one of the halogen—the original compound having acquired two more atoms of silver from the silver nitrate.

Since this chemical change must have a beginning, and may go on for a short time before any *visible* or appreciable change is produced, it is reasonable to suppose that in the case of an exposed collodion film containing iodide, bromide, or chloride of silver, along with free nitrate, the latent image is composed of the said iodide, bromide, or chloride of silver, *plus* some silver which has been added to it from the free nitrate. In that case the *most* sensitive of the three films should be *iodide* of silver, because iodine has the *strongest* attraction for silver; whilst the *least* sensitive should be *chloride* of silver, because chlorine has the *feeblest* attraction for silver of the three halogens; and this is precisely what is proved to be the fact.

In my next article I will discuss the case of exposure in contact with atmospheric moisture and organic matter.

THOMAS SUTTON, B.A.

ON THE PRODUCTION OF POSITIVES BY HERR OBERNETTER'S METHOD.

IT is often a desideratum of the photographer to be able to get a good glass positive quickly from a negative; but by the ordinary methods of copying in the camera of albumen plates or collodio-chloride of silver this is not always easy. They all demand considerable preparation, and are more complicated to work than is desirable. Herr Obernetter believes that his method is simpler than any. It has, in fact, only one drawback—it requires a bright day, or, better still, sunshine. With cloudy days or dull light the time taken to obtain the impression is far too long.

The theory is this:—That peroxide of iron is reduced by the action of light to a protoxide, the latter salt being hygroscopic, while the former is not. Thus an iron salt is obtained which is as sensitive to light as chloride of silver, say. All these salts, however, possess qualities which, however they be used, render facile operating with them rather unattainable, and accordingly Herr Obernetter sticks to a much simpler method.

The most sensitive solution according to Herr Obernetter's experience is the following:—

Citrate of iron	2¾ drachms.
Citric acid	1½ drachm.
Chloride of iron (concentrated solution)	30 grains.
Water	6½ ounces.

The citrate of iron is first pulverised very fine, and the three ingredients are then put in a beaker and the water added thereto. The mixture is then heated to boiling point, continually stirring it the while until the whole of the citrate of iron is dissolved, which will be in about five minutes' time. After it has settled the solution is filtered through paper, and is then ready, but it will only keep for a few days.

In order to prepare a plate with this mixture—which plate must be thoroughly clean in every sense—the glass is warmed slightly and some of the preparation poured over its surface in the usual way. After draining the plate should be allowed to dry in a horizontal position in a warm place. After five or ten minutes the plate will be dry, and smooth on the surface as a mirror. While still warm place it in the printing-frame underneath a negative and expose it—if in the sun, for five or ten minutes; if in the shade, for an hour or so. After removing it from the frame the operator should breathe gently all over the surface of the plate, whereby on careful examination it will be seen that the places where the light has acted become saturated with the moisture of the air. Should a pencil charged with graphite or rouge be now drawn hither and thither over the surface of the plate the image will quickly appear, and its development may be regulated by the breath, as necessity requires, by breathing here and there where it may be desirable to prolong or quicken the depositing of the metallic dust. It is easier to develope such a plate in this fashion than to reproduce negatives; for here the deepening or lightening of the image can be regulated at will. A clean pencil rubbed on too dark a place will remove the superfluous blackness. It is not necessary, either, to use so much graphite on the plate as with chromo plates; very little in the brush suffices. The hands are easily cleaned after an operation of this kind.

When the image is fully developed the plate is recoated with raw collodion, which is allowed to set, and then cut round the edges of the glass with a knife. After this the plate is put in a flat dish containing water. In three or four minutes' time the collodion film floats off, carrying the image with it. It may then be put on any other plate if desired, and, in fact, treated the same as negative reproductions. Should it be desired to leave the image on the plate where it was made without turning it the sensitive solution should be diluted with water to a third of the strength given above. Afterwards this film is covered with collodion to which some castor oil has been added and allowed to dry. The yellowish tinge will not be noticeable, and it may be easily varnished afterwards if desired; so that in this fashion good stereoscopic pictures may be produced with great facility.

SOME CAUSES FOR HARDNESS IN PHOTOGRAPHS.

Anyone whose fortune it may have been to look over a collection of "Rembrandt" pictures produced by different men, and which pictures have not been sophisticated by the retoucher, will have noticed the hardness in some, while in others, taking them as studies of light and shade, nothing was left to be desired. It cannot for a moment be supposed that these men lighted their models so harshly as appears in the result. Credit must be given them for knowing better than that; and it was upon looking over a number of such pictures, sadly deficient in those delicate half-tones which it is the charm of photography so faithfully to render, that I was led to seek for some other cause for the effect than that of careless lighting on the part of the operator.

The printing department was the one where it was first suspected this might arise, and no doubt it is here where many—perhaps it may be said most—of our errors are made; for printing is commonly looked upon as an operation so mechanical as to be entrusted to those who have but little skill, although it will be found that it pays best, in this and every other department, to obtain the most skilled and necessarily dearest labour.

Silver baths of varying strengths were used, printing in strong and weak lights were tried, but nothing beyond that already well known was elicited; and the conditions that will enable a printer to obtain a soft or hard print from the same negative have been so often laid down that it would be a useless waste of space to go over it again.

If anything in the printing department may be named it is that of fixing. The common practice is to weigh out a given quantity of hypo. and immerse prints in the solution thereof for a given time, totally irrespective of any variation in the quality of the paper, although it is well known that thick and thin papers have very different degrees of porosity—the one allowing the hypo. to permeate rapidly through its pores, the other offering more mechanical resistance, and so retaining the unaltered chloride of silver for a longer time in its body. Any person who may have left a print in the hypo. all night will have had unmistakable evidence of the solvent powers the solution has on the half-tones of the image, and therefore it wants but little to convince that the shortest immersion consistent with perfect fixation is the best for preserving the picture.

The only difficulty is to know "when is a print fixed." From fifteen to twenty minutes is, perhaps, the time generally employed; but this, I think, rather long in a general way. Practically, in making a print, I never time the fixing. This may be deemed wrong by some, but having done so for a long period, and having hitherto found no evil effects, it will take an accumulation of arguments to make me do otherwise.

The method followed, and the reasons for it, are as follow:—When a negative is fixed you watch it until the whole of the unaltered compounds of the iodine and bromine are removed, and then *at once* you proceed to wash, in order that the fixing agent shall not attack the half-tones; and why not do the same with your prints? It is just as easy to ascertain when the unaltered chloride is removed in the print by holding it so as to view it by transmitted light as in the negative; and when one print is found to be fixed remove the batch to the washing water, no matter whether the immersion has been five or fifty minutes. By doing so you certainly will have the minimum of harm done to your half-tones; and, should you doubt the perfect fixation, try two prints—one with the ordinary immersion, and the other with that described. Wash them together where they will receive the same treatment, pin them up, and see which goes first.

Still other causes must exist for the hardness. It is not reasonable to rest with an explanation that depends upon assuming carelessness on the part of the printer; for, taking the present standard of excellence of our best men, and an average number of their prints, it is a reasonable assumption to say that they faithfully represent the detail existing in the negatives from which they are produced, and thus we are driven to the conclusion that the fault of hardness exists in the processes that end with the production of the negative, and must seek for them here. From this, as a starting-point, a number of experiments were performed, and those having sufficient interest and bearing on the subject in question will be mentioned.

The first thing was to obtain a test object, the conditions to be fulfilled being that every gradation of tone from what may be photographically termed black to white should be represented. Lest it might happen that any image, although correctly lighted at one time, should have the conditions altered by a passing cloud, it was thought better to seek some object where gradation did not depend upon unequal illumination, and a strip having the varieties of colour necessary was at last decided upon, the highest light being the white of the paper. A new nitrate of silver bath was prepared thirty-five grains to the ounce, tested, and proved to be in good condition. A developer was then prepared, and so balanced as to develope and give sufficient intensity in the highest light to preserve sensitised paper so long as it was required to give correct value to the blacks; that is, a negative was obtained giving printing vigour without resorting to redevelopment. When a print was obtained from a negative of the strip, and so produced, it was found to be a faithful copy of the original. In the scale of tones each had its representative in the copy. Clearly such chemicals will faithfully reproduce any image; and should any defect—such as is under discussion—be found, it should be looked for in defective lighting rather than in the dark room.

Another bath (also thirty-five grains) was now tried—one that had been in use, and working well. Its age makes but little matter, as a much clearer idea of the work it had done may be given by saying that to make the developer flow easily one drachm of alcohol to sixteen ounces of solution was required. The developer was regulated with regard to intensity in this case as in the former, and to save further repetition it may be said the same was carried out in every case.

When a negative was made with this bath, and a print therefrom produced, a very slight falling off was noticed. The extremities of the scale were right enough, but in the lighter tones the reproduction was not so truthful, the white appearing to extend farther down in the copy than in the original. Here a step was made in the direction of hardness; still it was so slight that it was thought it would have escaped detection in any ordinary manner. Various modes of development were tried; but the result was the same, the tendency in every case being to hardness, and the one where the first development gave the required density had the least of this objectionable quality. It may be added that, as regards acidity, the baths were in every case equal, so far as could be judged by the colour of a strip of litmus paper on being moistened with each of them.

Another bath was now tried which was well charged with ether and alcohol from long use, so as to require four drachms of alcohol to the sixteen ounces of developing solution. Otherwise the bath was in good condition, and yielding average negatives; but, when tried with the strip, it failed in a most marked manner, a decided want being shown in the reproduction of the lighter tones, and the negative was, when compared with the first, certainly hard.

Reasoning from these experiments—although others were performed, but their bearing being the same, and it is thought the above are sufficient—the inferences were that a bath from its birth deteriorates, and shows the deterioration primarily in the loss of power to reproduce half-tone. The first part of the proposition no one will deny, and the latter portion the experiments enumerated go to establish; thus it seems that, practically, a bath ought not to be worked beyond a certain point, and that point each of us must establish for himself. A good rule I find is the amount of alcohol required in the developer.

Bearing this in mind, there is a great probability that the hardness in many of our Rembrandt pictures is owing to defective chemicals rather than that of lighting; for a bath giving fair ordinary work, when tried upon a subject requiring a great deal of half-tone to reproduce it nicely, may, and does, fail. With white drapery, for instance, I have never been able to please myself except when using a new bath.

The practical teaching here is to reserve the baths which are in the best condition for such work as may require them, and, as they deteriorate, let them go the round of their lives until their days are ended with a dose of common salt.

It would be a great boon if all the disadvantages attending the use of aqueous solutions of silver could be dispensed with, without bringing in their train other evils to neutralise the gain. It may be that ultimately an emulsion process will supersede the ordinary wet one; for, when it is thoroughly demonstrated that the plates are as rapid, *develope as quickly*, and give as good results, there is not a photographer in the kingdom who would not practice the process professionally in place of the one in use. But until that time, however, we must run on in the old groove. As to the methods of restoring old baths—for if it be possible to make an old bath into a new one few would spare the trouble if a practical means be advised—of course they must fall under two heads, viz., utilising them in solution, or precipitating and ultimately redissolving the precipitate. Upon which may be the best a variety of opinions may exist; but a discussion of how to "give new baths for old ones" may be deferred till a future time.

W. E. Batho.

NOTES ON PHOTOGRAPHIC HYGIENE.

Every trade and profession which men follow brings in its train a host of special diseases, sometimes dangerous or even fatal. They arise out of the exigencies of the work done, out of the condition of the workshop, of the atmosphere which men breathe, or from the nature of the materials with which they work; and if to these be added the evils which arise through ignorance and insufficient pay we shall have accounted for nine-tenths of all the diseases which haunt humanity.

These latter evils are, of course, of that general kind which can only be dealt with upon broad economic principles, and which affect the moral and social position of the artisan as much as his physical health, but the special diseases of classes of workmen arising out of the trade they pursue are of a different kind. Special remedies can be brought to bear upon these, and special evils met and cured. This is peculiarly the office of that part of medical science which we call "hygiene," and which deals with the art of preserving health—not of curing disease, but preventing it. Thus each profession or trade has its own hygiene—its special means adapted to mitigate or remove the evils attendant upon its practice. Of course these are based upon the general principles which run through all special cases. That all people should study cleanliness and have good air are, for instance, first requisites, and special hygiene is not therefore so much a special code of rules for every trade as an endeavour to bring the anomalous and unhealthy condition of every trade under the dominion of these general health laws.

The profession of photography presents its special dangers and inconveniences, which those who follow it would do well to study. Those engaged in it may not generally be subjected to the miseries consequent upon under pay and bad food and lodging, but still they are subject to evils that are often productive of disease. They have to live in an atmosphere more or less charged with etherised vapours, and daily handle chemical substances of an irritating or poisonous kind which may often do much harm.

The importance of this subject has induced a French medical man, M. H. Napias, to devote sundry brief studies to the purpose of expounding the cause and prevention of disease amongst photographers, and we purpose putting the gist of his remarks before our readers, to whom they may prove of great value.

First of all: it has to be noted that, as has been already said, the presence of such a number of chemical products in the photographic laboratory, and many of them highly volatile, vitiates the air, charging it with numerous foreign substances. Amongst these substances alcohol and ether hold the first place and merit careful notice. They charge the air with their vapours, particularly in summer, when both the natural heat and the hot-house studio heat increase their evaporation to an enormous degree. Highly volatile at all times, then they literally charge the air. The first effect of this mixture of vapours is to give a keen, penetrating odour to the air—one which variously affects workmen, but to which they generally become speedily reconciled. Some, however, M. Napias says, do not; and even after long habitude they are apt to experience, should their stay in the laboratory be prolonged, slight vertigos and even vomitings and severe headaches. In other cases there is neither headaches nor vertigo, but the appetite grows weak, and sleep becomes bad and intermittent or departs altogether. In still other instances, prolonged inhalation of ethereal vapours induces lightness of the head not dissimilar to the sensation of drunkenness. In these various ways, therefore, this corrupted atmosphere will be found to influence the health of photographers, and probably not infrequently these slighter maladies give the start to others more serious, and which we never think of tracing to them. Such are bronchitis, inflammation of the lungs, and congestion of the brain.

Whatever the case may be, the various effects which living in an atmosphere of this kind causes on various people teaches us that the first thing necessary to at least prevent its influence becoming serious is to avoid any excessive use of alcoholic drinks. If the abuse of alcohol has on a man, no matter what his occupation, a pernicious influence; if it be the origin of so many diseases and of so many vices and crimes; if it be the most common cause of idiotcy, in cases where there are no adjuncts but itself to help to destroy the body and mind—it is certain that in the case of professions like photography, where the action of the vapours inhaled unites with it and heightens its effects, it is well to avoid the danger by foregoing alcoholic drinks. The alcohol swallowed adds its influence to the vapour inhaled, or makes the vitiated air able to do harm, where otherwise the person breathing it might go scot free. Therefore an hour spent in a bar room or even at home, if drink be taken, might with much advantage be replaced by one in the open air; and in the warm days of summer the best drink that a photographer can have for refreshment, and which is safe, is either seltzer water or lemonade, or some other acidulated beverage.

In France a glass of *vin ordinaire* morning and evening makes no bad substitute if some quinine be added to it, or, better still, the quinine in its older form, Peruvian bark. The tannin and quinine which it contains form an excellent counterbalance to the effects of the ether, and at the same time it excites the appetite and promotes digestion. The price of such a decoction will not be found very great if one buys the ingredients oneself—not so dear as beer or spirits. Those amongst ourselves who do not like the *vin ordinaire* mixed with the bitter bark may substitute Marsala, or even water or a little spirits. Should acid drinks and quinine not suffice to remove the headaches from which so many photographers suffer, a few drops of ammonia and a few drops of vinegar in a glass of sugared water will usually prove an effective remedy. But of course the main cure for such afflictions is good ventilation, so that the air of the room shall always contain as near as may be a minimum of the hurtful substances. This is the hygienic remedy, and it is one which very few studios possess in perfection. The glass room itself may be tolerably well ventilated, but the dark room is too often the stuffiest hole imaginable, to the other health-ruining vapours of which may not infrequently be added a jet of gas burning so as to give forth poisonous fumes.

Another great cause of disease in professions is the attitude in which men labour. The constant maintenance of a particular posture, or repetition of a particular motion, induces physical changes which may amount in time to deformity, if they be not productive of positive disease. At first sight photography appears to offer no evils of this kind. The movements which those who work at it undergo are varied, and no part of the body is over-strained. But, looking a little closer, we find that this is only very partially true. Like all inventions the various labours related to which have become finely subdivided through its more perfect development, photography has become in many of its departments a thing of cramped or constant uniform motions.

Take, for instance, the case of the retoucher, and the effect of his work in weakening the eyes; the negative retoucher especially may be expected to suffer from this cause. These, with the trimmers and mounters, are all more or less placed in a sedentary, cramped posture unfavourable to the circulation, if not to the play of the lungs.

So, again, photographers who work at producing microscopic objects are very prone to suffer in the same way. An instance came under the observation of M. Napias of a person employed during the late war in the department for photographing despatches in microscopic size to be forwarded to the provinces. The pupil of the eye was congested and the eyelids in a state of chronic inflammation. This person is still employed on microscopic work, and he finds that this inflammation comes on with increased virulence whenever he is over-fatigued, and he wakes in the morning with his eyes sealed up by a copious mucous secretion. In such cases blue or smoked shades should be worn, and the eyes should, night and morning, be bathed with rose water, as well as a few drops let in on the eye three or four times a day. But these are the medical remedies for a state of disease fully developed, and the business should be to prevent matters coming to that pass if possible. The great principle to observe is to give the eyes rest in leisure hours as much as possible when engaged on such fatiguing work long or constantly; and even when well it is a wise thing to bathe them or dip them in cold water when over-fatigued, and to avoid reading at night or undergoing any new fatigue. Smokers should then reduce the habit, and avoid drinking too much liquid of any kind. Precautions of this kind will materially help to prevent premature decay of sight.

Posture, as we have already noticed, has also much influence upon certain classes of photographers. These are subject mostly to the same ills as clerks; and indigestive pains in the stomach or between the shoulders, with the like ills, are apt to haunt those who are weakly. These things have been so frequently treated of, however, and the preventives for their evils are so well known and belong to so general a branch of physical hygiene, that it would not be fitting to enlarge upon them under a specially photographic head. We shall, therefore, for the present lay the subject aside. It is, indeed, not so much in any posture as in the atmospheric condition under which he works that the photographer, strictly so called, finds his danger, and against these it is well that he should always be on his guard.

Contemporary Press.

ON WASTES.

[Anthony's Photographic Bulletin.]

In 1855-6 I was engaged in working the dry-plate process—and you recollect in those days we made very intense negatives with perfectly opaque skies—using the honey, gelatine, and other processes; but the manner in which we worked wasted an awful quantity of silver solution in the developments. I developed my plates of an evening, and used a large tray to catch the waste and slop; and in the morning, after having developed several whole plates, would find quite a quantity of silver precipitated, which, after pouring off the spent developing solution, would remain on the bottom of the tray. This, of course, set me thinking, and I commenced from that time to save my waste washing, &c., using my developing solutions for that purpose—pyrogallic and gallic acid, iron and the sulphides—until about the year 1859-60, when I found a much more satisfactory way of doing it, and so very satisfactory that I have had the method in constant use ever since. It is easy of application, cheap, has no bad odour, requires very little attention, and is, in fact, the *ne plus ultra* of silver-saving apparatus. I might have had it patented, perhaps could now, and, in fact, I am sure I could if the same rule would hold good in my case as in others.

However, to the description:—The first thing required is a keg holding say fifteen to twenty gallons for small galleries, and larger or, perhaps better, two or three of them, and in very large establishments barrels should be used. The kegs should have faucets set in about one-third the distance from the bottom, and a large hole cut in the head for pouring into it the washing waters, &c. These kegs are then to be filled with scrap zinc (which can be got from any tinman cheap). The zinc should be cut in strips and slightly bent or twisted, to prevent the pieces lying too close together; the kegs should be filled to the top with these pieces, and are then ready to use. We will say, for instance, there are two of these kegs. After printing the prints are washed. This washing water is poured into the keg, also the hypo., after having fixed the prints, and, in fact, any solution containing silver may be poured in in the same manner, until the keg is full; then commence with the second. Three kegs will not be required unless you fill one a day, and, when it is full, empty the first by the faucet (provided it has stood at least two days) into a vessel, so that the precipitate that will fall from the zinc in drawing off the liquid may be saved. The precipitate may be saved in any manner most convenient. This is all that is required, but observe not to pour any acid mixture on the zinc (this does not apply to the washing waters containing acetic acid).

The zinc will last a long time, but when it does waste and settle keep it filled up with fresh strips. In my practice, after collecting the precipitate, it should be well washed, to free it as far as possible from hypo., salt, or any soluble matter that may be retained in it, and then dried. I now take a large iron ladle and put into it some of the dried precipitate and roast it to a red heat, which will drive off and consume considerable sulphur and zinc, and make the reduction more easy. When at a red heat you will notice at times coloured flames arising from it. Continue the heat so long as these make their appearance; empty the ladle and proceed until you have it all roasted. Then pulverise the roasted precipitate, and when cold mix with two parts of powdered saltpetre (pure), and proceed to reduce to a metallic state by what I have called the Hadow method. This, in connection with the method of reducing, may seem complicated in print; but in practice it is very little trouble, and will save many a dollar to him who works it.

I have tried to make it clear; but should there be any who may meet with a difficulty in this or the process for reduction, on its being made known to me I will try and remove it. Jex Bardwell.

THE RECEPTION ROOM.

[Photographic Mosaics.]

Of all places about a gallery the reception room is the most important after all, and, at the same time, it is the one most neglected by the proprietors themselves. Go into two-thirds of the galleries and you will find the head of the establishment is not in—just stepped out, or upstairs, and can't be seen just now. "Won't you wait, or call again?" "No; I want to see him on business. How provoking I can never find him in!" "Can't I do as well," says the salesman or lady in waiting. "Maybe you can, and maybe not. I want my family taken; want to know the best time to come, and see the different styles; and consult as to the dress most becoming, and soforth." Mr. Assistant goes to show specimens, talks price, dress, and does not seem to care much whether our friend calls back or not. Seeing his disposition out pops Mr. Customer and drops into another gallery where he is acquainted, although preferring the former.

"Good morning, Mr. Smith." "Good morning, Mr. Jones." "Fine day for taking pictures." "Excellent; could not be better." "Well, I wish to have my family taken this morning. I hardly know what style I want. What would you recommend? You really know better than I do what size picture would suit a family of four best. What would you advise now?" Mr. Jones, having an eye to business and his pocket at the same time, recommends an 11 × 14. (Mr. Assistant most likely would have recommended a 5 × 7 at one-third the price.) "All right; that size, I think myself, is very becoming. Well, if my family come in about an hour will you be in without fail?" "Certainly, sir; never out during business hours. This is my post, and I find all my customers want to see me anyhow, and they think, and I know, I can generally tell them what they want when they don't know themselves, or hardly ever give it a thought."

Now I am aware from my own experience that I lose hundreds, and I might say thousands, of dollars a year by not paying that close attention to my reception room that I should, and being on hand at all times during business hours. You know how it is yourself. Go into any place of business where it requires the attention of the principal and you feel very much disappointed if he is not in, and this "call again" does not suit you. So remember to follow out the principle yourself; it matters not how good your assistants in that department may be, they never can fill the place of the commander-in-chief.

I saw the above illustrated in one of the principal galleries in New York last summer. A gentleman called in while I was there and wanted some work done—wanted to see the proprietor; was told by one of the assistants that he was busy upstairs and could not be seen just then. So he went away seemingly disappointed. Curiosity prompted me to go upstairs to see what celebrity the proprietor was taking that he could not be disturbed a few moments, when behold I found him varnishing negatives to show proofs from. After shaking hands with him I remarked—"What are are you doing up here?" "Why," he says, "just helping the boys." I thought to myself you had better let the boys do boys' work and you attend to your reception room, where, no doubt, he had just lost at least fifty dollars by "helping the boys," and he did the work no better than the boys could have done it themselves.

I hope by these few remarks that those who have galleries will attend in person more to the reception room than they now generally do. They will find it to their advantage. Hire your help if you are master of the situation; for there is nothing so satisfactory as taking good orders, praising up the quality of your work, pleasing your customers, seeing the money come in and taking good care of it too, and then talking to your customers, after making them well pleased, as they go out of your gallery, and inviting them to call again. J. H. FITZGIBBON.

ON STELLAR PHOTOGRAPHY.

[PHILADELPHIA PHOTOGRAPHER.]

1.—THE OBJECT OF STELLAR PHOTOGRAPHY.—The fixed stars are to us such infinitely small objects that we may observe them through the strongest enlarging apparatus that has ever been constructed, and yet they appear only as points without any appreciable size, so they are rather queer objects to be photographed. As their image is a luminous point their photograph is nothing but a small speck—the smaller the more the lens is correct and the state of the atmosphere favourable. All this even if the largest lens be used which gives beautiful pictures of the Sun with his spots, the Moon with her mountain ridges and chasms, the planets with all that has been observed on their surface, Saturn with his rings and zones, and Jupiter with his belts. The object of photographing fixed stars cannot be to get a likeness of them. Their photographs are all alike—little dots, the size of which depends more or less on the time of exposure; yet if we could bring our camera nearer to them a fair number of billions of miles they would all show individual appearances. The millions of miles which we are carried about by the earth in her yearly way round the sun do not do at all for this purpose. However, this motion offers chances which are used in stellar photography for other purposes.

The object of stellar photography is the photography of constellations or of the relative positions of stars. The determination of the positions of the fixed stars has been always one of the chief objects of astronomers. It might be supposed that the catalogues are complete, and that the matter is settled. It is not. The catalogue of stars, as far as photography can be now applied to them—that is, to the ninth magnitude—are not complete; besides, all measured quantities are capable of correction by varying and refining the methods. The photographic process has scientific importance, because it offers advantages in facility and correctness of results. But what, after all, is the use of knowing with all possible accuracy the positions of thousands and millions of fixed stars? If they are and will remain the same since creation, why not leave that work to generations thousands of years after us, when all things more useful to mankind will have been invented and recorded?

The fixed stars are not, what their name indicates, without motion. All nature is restless, so there is no end of studying it. The fixed stars, indeed, change their places so slowly that the builders of the Pyramids, four thousand years ago, saw the constellations very nearly the same as we do now. The most refined astronomical methods only show in some cases that change within a small number of years. The study of the proper motions of the fixed stars has been just begun, and requires accurate measurements continued for ages.

The matter has another interesting view. The fixed stars are not motionless, and they are not fixed either to a huge sphere encompassing the heavens; their distances from the earth are different, though those of the nearest are astonishing. The photographer who wants to take a picture of any object will always try to get a different view of it. Two pictures of an object at a moderate distance, taken from two points a few inches apart, appear different to the eye, and produce combined the stereoscopic effect. No distance on earth is sufficient to give different pictures of the constellations. However, within a year we are swung about the sun in a circle of one hundred and eighty-six millions of miles diameter, so that after half a year we are at a place in space one hundred and eighty-six millions of miles distant from our present. That enormous distance is just sufficient in some cases, not for the unaided eye nor the stereoscope, but for the most refined astronomical methods, to show a change in the relative positions of some stars with their neighbours. When we ride on the railroad over plains and see spread trees in the distance the nearer ones seem to go back, while the distant ones seem to keep up with us. If we know the speed with which we go on, and measure the apparent change of position of a very distant and of a less distant tree, we can compute the distance of the less distant tree. That is the principle by which the distance of the nearest fixed stars has been found; it is billions of miles.

By combining accurate measurements of the positions of neighbouring stars for years and centuries a change can be ascertained, and the proper motion of the stars measured. By combining the differences of position periodically during a year the distances of the stars can be measured. It is obvious that perfect photographic records, which can be kept and measured again at any time, must be of the greatest value for these two great problems of astronomy.

2. *The Methods of Stellar Photography.*—Persons whose pictures are taken are very liable to move if the time of exposure has some length. Stars move continually, and the exposures for faint stars must be pretty long. However, stars move regularly, so that the difficulty can be overcome by moving the camera equally.

The camera used in stellar photography is the equatorial telescope. Its construction will be easily understood, though it will be lengthy to remind and explain some elementary astronomical conceptions. A common photographic camera, the image of which we observe with a focussing-lens, is scientifically the very same thing as a telescope. The ground glass of the camera serves merely for the fixation of the focus. If the image on the ground glass is sharp, and the ground glass then taken away while the focussing-lens is kept in the same position, the same sharp image is seen, only brighter. Of course, the astronomical telescope does not contain a ground glass. The peculiarity of the equatorial telescope consists in its mounting; its object is to follow the stars in their daily motion.

Everybody knows that in reality the earth rotates every day round its axis, and revolves within a year round the sun; but the old abolished error to consider sun and stars moving round the earth is still easy for demonstration. The stars rise and settle like the sun, and rise again after twenty-four hours; in fact, they get some minutes ahead of the sun every day, and after a year these minutes have summed up to a full day. This is the reason that the midnight sky changes its aspect through the year, but is the same again after the lapse of a year; it is the reason that for a thorough survey of the stars a period of about a year is required. The motion of the stars is perfectly uniform; they seem fastened to a huge sphere which rotates round an axis, of which one end or pole is seen in the northern hemisphere, while here far south the other pole is up. If an axis is put up pointing exactly to the visible pole, and that axis is revolved by a clockwork, making, like the sphere of the world, one rotation in twenty-four hours, it will be the same thing for appearance as if the sphere of the stellar universe had been invisibly fastened on that axis and was revolved by it; therefore, if we fasten to that axis—the polar axis—in any way a telescope, pointing it to a star, that star will appear perfectly stationary in the telescope as long as the clock is going and the star is above the horizon. The fastening of the telescope is effected so that the polar axis carries a piece containing another axis vertical to the first, at the end of which the telescope fits. That is the parallactic mounting of the equatorial telescope.

For common astronomical purposes the equatorial telescope has an eyepiece which can be slid over the field of vision for the observation of the images of stars produced by the front or objective lens. This sliding motion is effected by means of an exact screw, the micrometer, and can be measured correctly. In the photographic telescope the sensitive plate receives the images of the objective lens. As the photographic negative is a permanent record of what the astronomer sees it can be measured and measured again at any time, and can be measured with a more perfect micrometer than that which can be attached to the movable telescope.

Stellar photography was first introduced into science by Professor Bond, of Cambridge, Mass., some twenty years ago; but it was Mr. Lewis Rutherfurd, of New York, who brought the methods to perfection, and constructed a photographic objective glass of eleven inches aperture and about thirteen feet focal distance. This lens shows in a very high degree what is called difference of focus. It does not give a definite colourless image for vision, but it is perfect for photographic rays. When the focus has been ascertained approximately it is correctly determined by photographing a star at different positions about it; the place of the most correct image is ascertained, and, by repeating the trial, the focus of the lens of thirteen feet focal distance can be determined to the hundred-and-fiftieth part of an inch. Of course, all celestial objects have the same focus.

No lens can give an image of large field with perfect correctness; on account of the absolute correctness which stellar photography requires the field used is very small—about one and a-half degree in diameter. Deficiencies even within this field can be ascertained by photographing an exact scale and comparing the picture with the original. A field of one degree and a-half comprehends the well-known constellation of the Pleiades, or three times the diameter of the moon; it corresponds to the view of a human face at about forty feet distance. If the photographer would not be allowed to employ a larger angle of field in portraiture he would want very big lenses, as the usual lenses at forty feet distance from the sitter do not give large heads; to his good luck people's faces are not so mathematically regular, and most are not at all fond of absolute likenesses.

This photographic lens, mounted in an equatorial telescope, which is driven by a perfect clockwork, gives, with short exposures, the images of bright stars as small, round dots only perceptible by an eyeglass; with long exposures the pictures become larger and easily visible to the naked eye. With long exposures their size depends finally on the intensity of the shake of the atmosphere, which appears to the eye as scintillations of the stars. With exposures of eight minutes stars of the ninth magnitude are photographed—that is, stars ten times fainter than the faintest which can be seen in a clear night, straining the naked eye; their pictures are very small dots. It would be very difficult to distinguish these small dots from particles of dirt on the plate. After the first exposure of eight minutes the telescope is slightly moved to another position, and a second exposure of eight minutes made, while the driving clockwork is going and keeps the image steady in this second position. So each star on the plate has two images very near each other, the distance and relative position of which is the same for all stars of the plate. These double images can be easily found and identified on the plate.

When the telescope stands still, and the star-images in consequence move on the plate, bright stars leave a trail, as walking persons do in the photograph of a landscape. This trail is of great importance for the fixation of the direction east to west on the plate. With faint stars, by which no trail is produced, a third exposure serves for 'the fixation of the direction east to west on the plate. With faint stars, by which no trail is produced, a third exposure serves for the fixation of this direction, made after having stopped the telescope for some minutes.

I have to come back to a point of great importance—the adjustment of the driving clockwork. The polar axis, though the telescope is perfectly counterbalanced, offers a considerable resistance to rotation; the clockwork, in order to move it steadily with perfect regularity, must be of particular construction, with spring escapement and capable of delicate adjustment. When the star-image moves during exposure the picture is no more circular but lengthened. As in measurement, the centre of the picture is to be fixed exactly by the eye. It must be correctly circular; besides, the faintest stars capable of giving an impression during eight minutes' exposure will not give any impression if the image moves.

I said before that the stars move with perfect uniformity, so that in the telescope driven by a good clockwork their images are stationary. That is not precisely so by the effect of the refraction of the atmosphere. If we look obliquely on the surface of water and see a fish in the water it is not really in the direction where we see it, and shooting in that direction we will not hit it. To our eye it seems to be at less distance from the surface; to its eye we seem to be higher above the water than we are. The light coming from the fish is deflected when it passes into air, so that it makes a smaller angle with the surface outside than inside the water; the light coming from us makes the same way in the opposite direction. So the light coming from a star is deflected by the atmosphere, and we make the mistake of the fish—the star seems to us always higher than it is in reality. This elevation of the stars by refraction is not uniform while the stars are coming up higher and higher; it follows a complicate law. The amount can be calculated for all stars at different altitudes above the horizon, and for the latitude and height of the place of observation. The clock driving the telescope can be adjusted indeed only for uniform motion, but from the tables the time can be chosen for photography when the amount of refraction is nearly uniform for eight minutes, so as to allow a corresponding correction in the clock-rate. In this way the motion of the image can be reduced to less than one-ten-thousandth of an inch during an exposure of eight minutes.

3. *My Work Done with a Broken Lens.*—I went last year to Cordoba, South America, to take, at the National Argentine Observatory, photographs of southern constellations, under an arrangement made with Mr. Rutherfurd in New York. I expected to use the photographic lens of eleven inches aperture I have spoken of before, formerly owned by Mr. Rutherfurd, since some years the property of that observatory. On my arrival in Cordoba I found that precious lens broken; the back lens of the system was divided in two by a crack near the middle. My expedition seemed to be an absolute failure. The observatory has another lens of the same dimensions for optical purposes; it was tried but it would not do for photography. If anything at all was to be accomplished I *must make the broken lens work.* By using only one-half of it the intensity of light would have been reduced too much for the intended purpose, so it was necessary to fit the two pieces again together. That was to be done in a small city in the interior of Spanish South America, which, indeed, does not offer many facilities for such work. Of course the two pieces of the broken lens could not be stuck together; that might have been done with a small photographic lens and for common purposes. A delicate adjusting apparatus had to be constructed, worked by screws. With the assistance of a watchmaker I succeeded in constructing such an apparatus with sufficient accuracy; each piece of the lens is kept in position and made adjustable by three pairs of screws.

Then the adjustment of the lens began. It could be done only by photographing a bright star; the defects of the picture had to be examined, the lens was taken out of the telescope, the *right* screw had to be tightened or slackened the *right* amount, and that operation to be repeated again and again. It was not a simple lens the parts of which were to be adjusted; that would be relatively easy. It was the *concave* lens of a system. It had to be studied beforehand what effects displacement and deformation of the parts of that lens exert on the shape of the star-image. While the lens had been in its perfect state the parallel rays of a star were refracted by the lens into a regular cone, the point of which is the sharp focus, yielding a very small circular dot as the star's picture; taking a picture outside of that focus, it still appeared as a perfectly symmetrical circular spot, only larger. In the beginning the broken lens gave in focus *two* distinct dots with irregular prominences; the image taken half-an-inch outside of focus consists of two separate spots with irregular appendages. Each half of the lens gave its own image deformed by bending and pressure; these images had to be made by corrections regular and coincident. The pictures taken outside of focus are particularly fit to recognise the faults in the different parts of the lens. After months of wearisome trials and corrections the lens has been so far adjusted that the images are nearly perfect, and the lens works almost as well as in its former intact state, but with some decrease of intensity.

There was another severe difficulty which frustrated the success when the lens had been set right—the insufficiency and want of delicacy of the driving clock, which could scarcely be overcome.

The scientific results can be comprehended here in a few words. Stellar photography is, of course, particularly applied to condensed groups of stars. The northern sky has two prominent dense groups of stars, the generally-known Pleiades and Præseps—a group which appears to the naked eye as a luminous cloud; both have been photographed, and within a field of one degree and a-half give respectively thirty and forty-five stars. The brilliant southern ring of the milky way, the glory of the southern heavens, has a number of much denser groups. I have selected and photographed nearly thirty star clusters, of which the richest yielded, in the most favourable night, one hundred and twenty-three stars.

The Argentine Government is going to provide for the Cordoba Observatory a new photographic lens from Fitz, in New York, and I have been asked to continue the work with that lens, which, of course, promises superior results.

C. S. SELLACK, Ph.D.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF FRANCE.

AT the May meeting of this Society the chair was taken by M. Davanne, and, after a new member had been voted for, leave was given to the Secretary to go through the correspondence.

Several memoirs, notes, &c., on the value of photography as an aid in astronomical observations, and *apropos* of the coming transit of Venus in December next, were entered into, and in particular one recent communication to the Academy of Sciences was signalised as worthy of note. In it M. Ch. Zenger detailed his success in celestial photography by a method often tried before but without great encouragement as to results, viz., the substitution of a concave mirror for the ordinary objective. M. Zenger has succeeded by its instrumentality in obtaining images of the sun and moon which have been enlarged to the enormous size of 110 English inches. The concave mirror is of long focus, giving an image of from one to two inches in diameter, with quite insignificant spherical aberration.

The indefatigable M. Rodriguez, of the Portuguese Official Photographic Staff, forwarded some excellent maps, and on their presentation opportunity was taken by

M. G. FORTIR to state that he had tried M. Rodriguez's process as indicated in the *Bulletin*, and of course without the perfecting supplement which had been deposited for future revelation with the Society, and he had obtained excellent results. The thin coating of gelatine—two parts of gelatine and two of bichromate of ammonia to one hundred parts of water—adhered perfectly to the zinc, which it was necessary to clean with caustic potash.

M. DAVANNE said that M. Rodriguez had revealed as much as his official position would at present allow; but his remarkable success in so rapidly organising a photographic survey service for Portugal, and the works he turned out, were proof of his great ability. The great feature of his plan was the substitution of a sheet of tin for the paper support.

Passing on to the review of contemporary literature, the Secretary pointed out several renewals of old processes—amongst the rest, one in the *Rivista Fotografica* on intensification with the blowpipe or by atmospheric pressure. Of more interest, however, is a note quoted from the *Moniteur Scientific*, by M. Metchel, on the preparation of gun-cotton. According to him the following method gives at once a cotton highly explosive and very soluble in alcoholic ether:—Boil for several hours, always renewing the evaporated water, ten parts of cotton with one of carbonate of potash and one hundred parts of water. Afterwards treat seven parts of the cotton thus purified with a mixture of seven parts in weight of nitric acid of density 1·42 and four parts of sulphuric acid of density 1·84, after the mixture has been cooled to about 27° (80° Fahr.). The whole is placed in a cool place for four days, after which the cotton is taken out and washed first in warm ordinary water and then in cold distilled water, when it is wrung out and dried. We thus obtain eleven parts of gun-cotton perfectly white, which burns without residue, and which is easily dissolved in sulphuric ether, nitric ether, acetic ether, and glacial acetic acid. It becomes of still higher quality if treated a second time with the mixture of acids.

Some discussion then arose on a note of Colonel Stuart Wortley's regarding alkaline development.

The CHAIRMAN called attention to the frequent recurrence of the word "deposit" in Colonel Wortley's remarks, and asked whether any of the members present had studied the subject, and could say if the action of the alkaline development was simply a reduction of bromide of silver, or only a combination of the organic matter of the developer with the reduced silver. It was an important subject from the point of view of the photographic theory.

M. Ferrier said that he had used the alkaline developer with success, and, according to Mr. Stillman's recommendation, esteemed it best to use liquid ammonia. There was no need to fear decomposition, and the action was very regular. He used a silver bath of from eighteen to twenty per cent., leaving the glass in at least five minutes, and developed with—

A ten-per-cent. solution of pyrogallic acid..	2½ drachms.
A four-per-cent. solution of bromide of potassium	8 drops.
Liquor ammonia	8 ,,

If the silver bath be very weak the film is thin and the image difficult to strengthen. He had not investigated the nature of the substance which forms the image.

M. Lacan thought that Mr. Sutton had said something on that point in his communications to the *Moniteur*, but could not call to mind what or when.

The Secretary thought Mr. Sutton had only pointed out that the image was certainly soluble in dilute nitric acid, and that use might be made of that property to obtain a transparent positive directly in the camera. That was a presumption that the image might be pure silver, but there was nothing to lead one positively to say that a mixed image of silver and organic deposit would not behave just the same.

M. Gobert had an experience which appeared to contradict a statement which had been made as to the inefficacy of bicarbonate of ammonia in the developer. His images were persistently veiled, and he conceived the idea of passing a current of carbonic acid through the developer. The veiling ceased at once, and repeated trials had always given the like results.

The Chairman said that those who wished to try M. Gobert's experiment, and who had not the means of producing carbonic acid off-hand, might use seltzer water. He repeated, also, his request that members would study the nature of the alkaline-formed image.

Mr. M. Carey Lea's article from The British Journal of Photography on the *Influence of Colours on the Reductive Action of Light*, was then read, with remarks on Dr. Vogel's observations.

M. Derogy exhibited a new mirror for enlarging, worked by clock machinery, and taking the place of a heliostat. It is a simple apparatus which, without the extreme exactitude of movement of the costly heliostat, is yet sufficiently regular for practical purposes. The wheel-work is so constructed that the motion slackens towards midday, and then quickens again gradually as the sun goes down. The inclination of the mirror is regulated by a button, and a shaft driven by the clockwork makes it follow the sun. The instrument ought to be placed so that its axis may be on the plane of the meridian. The clockwork may be dispensed with, and the mirror moved by a knob by hand.

M. Durand sent, through the Chairman, a communication relative to his new dark tent, which claims for it very high qualities indeed, but we cannot find space here for a full description; and, as the model is to remain apparently with the Society for improvements and suggestions, we may possibly have an opportunity of recurring to it.

There was nothing further of importance transacted, and the meeting was adjourned after some minor subjects had been discussed.

PHOTOGRAPHIC SOCIETY OF VIENNA.

At the April meeting of this Society the chair was occupied by Dr. E. Hornig.

The Secretary read the letters of thanks for election to honorary membership of the Society received from Dr. Vogel, Mr. H. P. Robinson, and others.

Councillor Martin then rose to make some corrective remarks relative to a statement made in the previous number of the *Correspondenz* regarding Herr Paul Pretsch's patent. He referred to the fact that soon after the discovery of photography he had engaged in researches with a view to transferring the image to the stone—not so much that it might be at once printed from, as that it might form the basis for working on with chalk or Indian ink. The precipitation of oxide of silver by the usual method of employing chloride of lime helped the carrying out of this idea. Herr Paul Pretsch, who had worked for some years in the same direction, had repeated conversations with him on the negative results, as well as made notes regarding the observations of Mungo Ponton on the reaction of chromate salts, and thereby he probably reached his later mode of working. Herr Martin was convinced that Pretsch reached his conclusions quite independently of Talbot, and by quite other ways; and he expressed the wish that the originality of Pretsch's discovery, especially as regards the grained effect produced by roughening the surface of the composite, should be distinctly stated, and made a motion to that effect, as also that the Committee of the Society should take into consideration the best means of furthering extended researches in the same direction by the offer of a prize.

Herr Eppel said that he was quite prepared to lay before the Society some newer observations on this process, but that the State printing-office authorities would object.

The Chairman said that he was preparing himself to enter into some details of the history of this method, and as soon as the materials were gathered together he would do so. He rather thought that the State printing-office might object now; but, when Pretsch's privilege was exhausted, Herr Eppel might make his observations without the slightest fear of anybody interfering with him.

The motion of Herr Martin was agreed to.

Herr Ritter, of Sternfeld, pointed out sundry faults in albumen paper, which were due, in his esteem, chiefly to the fact that not one of the two makers of "raw" paper were able to maintain any stock, and that, consequently, albumenisers were compelled to work with new-made paper; hence the sizing was not thoroughly dried, and during albumenising there was set up an unequal absorption, whereby dull spots and measles were produced. It was of great importance, though contrary to common opinion, to use old instead of new-made plain paper for albumenising. Should the paper thereby become very hard it might easily be softened by placing it in a damp place, such as a cellar, for a short time. He further thought it wrong to employ weak silver baths, and great care should be taken not to prolong floating.

Herr Haack, in reference to some remarks of Herr Johannes with regard to the frequency of metallic spots in albumenised paper, said that he had often to combat with these pests, which were most troublesome in the skies; that he had often observed, under the microscope, the silver precipitated at the point. The spots were due probably to the passing of the plain sheets between metallic rollers.

An array of minor matters was then dealt with, such as receiving photographs, Captain Abney's and Dr. Vogel's books, &c., and the mentioning of firms in Vienna where good mica plates could be obtained.

The question-box furnished food for a discussion on the question whether sensitiveness was increased by a warm silver bath, especially if the plates were sensitised in a bath in the camera. Many were of opinion that this heating would tend to produce failures through over-rapid precipitation, but there did not seem to be any definite knowledge upon the point.

With some remarks on the possibility of joining electricity and photography so as to produce newspaper illustrations for use in the printing-press, but which suggested nothing of value, the business of the meeting concluded, and it was accordingly adjourned.

At another meeting of this Society, on May 5, the chair was taken by Dr. Hornig, the President. After preliminaries,

Herr Victor Angerer called attention to M. de Constant's improvements in the coffee dry-plate process, whereby exposure was very much shortened.

The Chairman said that he had recognised the value of M. de Constant's *brochure* to be so high that he had had a translation of it prepared, and was republishing it in the *Correspondenz*, and he was very glad to see that Herr V. Angerer was busy in the same field.

Herr J. Homolatsch demonstrated his method of preparing albumenised paper, which was simple, and about which we may have more to say.

The Chairman then laid before the meeting a copper plate, prepared for relief printing, sent by a member (Herr von Kolkow, of Gröningen). It is prepared by galvanism, and is a somewhat enlarged reproduction of a woodcut from the *Doré Bible*. He was not then at liberty, however, to enter into details as to the nature of the process, of the value of which members could only judge by results.

A zinc relief plate of Herr Obernetter was also laid before the meeting, and further information upon its manufacture was promised at a future time.

Nothing else of any importance occupied the meeting, which was soon afterwards adjourned.

Correspondence.

A Day's Experimenting with M. Mévius, at Rennes.

The day before I left France on my present visit to England was spent with M. Mévius, of Rennes, in making some experiments with my moist process, which I will now describe as being the best answer I can give to the letter of Mr. J. H. Waite, at page 261, who seems to be in difficulties with that method of working.

We used the nitrate bath with which M. Mévius was then taking portraits professionally, and two different kinds of collodion, both of which he found very good in his ordinary wet process with the iron developer. One of these collodions was my own bromo-iodised, made expressly for portraiture, and not containing quite so much bromide as is usually added for dry plates. The other collodion was a mixture of my own with a little of Thomas's and Blanchard's, being that which M. Mévius commonly uses in his professional work.

The test object was a difficult one, including a sun-lighted wall, along with the under side of some joists in deep shadow. The question was—Which process would deal best with this subject, so as to show the details of the joists, and yet not solarise the bright wall—the common wet process or my moist one—the same collodion and bath being used in both cases? Also—What would be the difference of exposure required?

As the experiments were very instructive, and I have kept a note of them, I will now lay them before the reader. We used a view camera, with a doublet lens and small stop; the plates being cabinet size.

The first experiment was with my own collodion and a common wet plate developed with iron. The exposure given was twenty-eight seconds by the watch, and the result proved quite satisfactory; for, as it happened, we had hit upon the right exposure at the very first shot.

A moist plate was then prepared with the same collodion in the following manner:—Having excited the plate in the same bath in the usual way (leaving it in the usual time), we put it face upwards into a glass dish containing distilled water, and washed it well in this; then in fresh water several times renewed, all of which occupied about five minutes; and, lastly, poured over the plate some organifier made thus:—Albumen, one part; glycerine, one part; water, two parts. We then wiped the back, and put it into a box to drain for a few minutes, after which it was exposed, the time given being two and a-half minutes. It was developed immediately with acid pyro. and silver, and gave a very clean, bright, dense negative, but a little under-exposed in the deep shadows of the joists.

We next prepared another plate in the same way, and gave it the same exposure; but this time developed it by the alkaline method before applying the acid pyro. and silver. A softer and better negative was now obtained, showing the details in the deep shadows extremely well, and having the beautiful yellowish-brown colour which is characteristic of albumen.

My friend was much pleased with these two results, and regarded the process as quite a success, and one likely to be of great use to him in taking views of the town, interiors, &c., without the bother of a tent and all the wet paraphernalia; but, although alkaline development evidently shortened the exposure, he determined to have nothing to say to it, but to stick to pyro. and silver, and console himself with a *cigarette* during the more lengthy exposure which that would require.

Having got on well thus far we next tried the mixture of Sutton, Thomas, and Blanchard, which worked so well in portraiture by the common wet method. But here, for some inexplicable reason, two plates fogged badly, although every precaution was taken in their preparation. It is just possible that the collodions which were mixed with mine may have contained something which was unsuitable for washed films organified with albumen and glycerine. At any rate, I know of no other explanation of the mystery.

Lastly: a plate was prepared with my collodion in the same way as before, and put aside in a box until the following day, when it was to be exposed and developed. My friend, who is always up with the lark, exposed it in the street to a view of his own house before breakfast; and after our meal he developed it himself whilst I was writing a letter. It was a lovely morning, and all ought to have gone right; but presently he came into me with a rueful countenance and the following strange story:—He had applied the pyro. alone, having forgotten to add the silver, and this had brought out a very clean and perfect image, but too thin to print. In order to intensify it he had added a few drops of silver to his developer and poured it again over the plate, when, lo! the whole turned as black as ink and the negative was ruined! What could possibly be the reason?

For a moment I was puzzled; but at length the light dawned upon me, and I suggested that he might have forgotten to add the acetic acid to his pyro. This actually proved to be the case.

What I chiefly wish to point out from the above experiments is that the same collodion and bath may be made to serve for both processes, wet and moist, although a collodion containing more bromide and less iodide would be better for moist plates, and that is why ours that morning were comparatively so slow. If our bromo-iodised collodion had been specially prepared for the moist process the exposure, with the alkaline development preceding the pyro. and silver, would not have exceeded double that which was required for the wet plates.

With respect to Mr. Waite's suggestion that I should publish a second edition of my pamphlet on the moist processes, the question for *me* to consider is—Would it pay the expenses of printing and advertising? I am afraid it would not, because so very few people are really interested in this method of working. Just now the emulsion processes are on the *tapis*, and it is better to see what can be done with them than to issue new treatises on methods which are not generally appreciated, and which may be superseded by some wonderful new discovery in emulsion working. If a moist plate, which might be either slow or rapid, and which would keep for a day or two and yield a good result, were at all in demand by photographers, a shilling pamphlet in which a good process of preparing such a plate was described might possibly sell; but until the want of the thing is more generally felt it does not seem to be advisable to publish. If we each follow up our own pet process perseveringly, and describe from time to time *in this Journal* how we get on, that should be enough for the present.

The only point of much practical importance which I have discovered during the past year in relation to washed films is to give up the use of gutta-percha washing baths and use glass ones; and also to be very particular respecting the purity of the washing waters. *Organic* impurities in the *first* washing bath seem to be a fertile cause of failure, because an organic compound of silver is formed which is highly mischievous. According to my own experience, it is very important to remove every trace of free nitrate from the film before applying the organifier, if the plate is to be kept for many hours, in hot weather, either in a moist or dry state, or if it is to be developed by the alkaline method. But there is nothing new in all this, because the principle was discovered by Dr. Hill Norris, and confirmed by Major Russell, many years ago. I am more convinced than ever that bromide of silver not only does *not* require free nitrate or any organic compound of silver nitrate, but is far better without it, the film being more sensitive, keeping better, and developing cleaner; and my creed on this point is based upon a number of experiments very similar to those which Mr. Herbert Berkeley has published at page 284. Some of them I will describe in my next letter. THOMAS SUTTON, B.A.

June 15, 1874.

STAINED FILMS.

To the EDITORS.

GENTLEMEN,—The question of staining the film *versus* backing must be one of interest to many of your readers, and you may find room for a few words from me.

Doubtless aurine has inconveniences; but why use it? I have before recommended roseine in your columns, which does not affect the sensitiveness of the plate at all (aurine, indeed, with a properly-made emulsion doing so in but a very small degree). And why stain *the film?* It is perfectly practicable to stain the *substratum*, and then to lay an emulsion on a substratum stained to any depth of colour. The alcohol and ammonia used in developing penetrate through the film, and bring away all the colour from the substratum, and it is a very pleasant way of using the colour.

We ought to be very grateful to those who first led us to staining films, in place of using the messy, dust-producing backing.

The backing must have something glutinous in it. When dry it powders and gets on to the film; moisture then gets to it, and the backing dust adheres to the film tenaciously. No soft brush will get rid of it, so let us do away with it if we can.

Will Mr. Stillman make a contribution to emulsion knowledge, and tell you how he made the emulsions giving such different results? I think I shall be able to show him clearly the reason for the variation, and your readers will be benefited by the discussion.

I have shown to yourselves how to a certainty plates can be made very sensitive and giving abundant density, and the experience gained in working out this problem will, perhaps, enable me to account for the variation in Mr. Stillman's results.—I am, yours, &c.,

June 23, 1874. H. STUART WORTLEY.

CORRECTION.

To the EDITORS.

GENTLEMEN,—Mr. Sutton's article on *The First Step in Photographic Chemistry* (THE BRITISH JOURNAL OF PHOTOGRAPHY, May 29) contains an allusion to Dr. Liesegang, which should not have been made on the authority only of a third person's report.

The facts with regard to the formula which he attacks are these:—Dr. Liesegang gave me a formula when I was at Dusseldorf, written hastily on a scrap of newspaper, intended, I suppose, rather suggestively than definitely explanatory of the subject I inquired about. This I wrote down from the original, which was afterward thrown into the waste-paper basket, and when the proof came to me of the article containing it the formula was so mixed up from misprints as to be utterly unintelligible. Not having the original by me to correct it by I made it what I supposed Dr. Liesegang intended it to be. He has sent it to me again, and I rewrite it for Mr. Sutton's benefit, the whole thing having passed from my memory long ago. It is (2 Ag NO_6, Ag Br) copied exactly from his letter, which I shall keep to correct proof by.

Mr. Sutton will, then, please level his criticisms at me for not stopping to think whether bromine was a monad or a dyad, or if even it were not a *dryad*, which I think most likely, from its susceptibility to green foliage, as well as from the use we commonly put it to.

Dr. Liesegang is far too good a chemist to make himself amenable to such a paragraph as Mr. Sutton's, which will rest quietly on my shoulders, long used to much sharper criticism.—I am, yours, &c.,

W. J. Stillman.

8, *Altenburg-gardens, Clapham Common, S. W.,*
June 22, 1874.

COLLODIO-CHLORIDE AND MEEK SWEARING.

Lord Scollop.—"A meek man, said'st thou?"
Thwack.—"Ay, my Lord!"
Lord Scollop.—"H'm! yet I heard but now his voice high pitched with loud anathemas, as 'twere some lusty preacher damning all mankind."
Thwack.—"He's at his prayers, my Lord."
Lord Scollop.—"Faith, then, if that be praying methinks we, soldiers, shall prove chiefest saints in heaven. Yet thought I that he swore in fear, and ever as he cursed cowered darkling as one afraid some fiend might claim him. And say'st thou 'twas his prayers?"
Thwack.—"Not I, my Lord, 'twas he. He calls that thou heard'st his 'orisons,' wherein he mourns the sins of frail humanity."
Lord Scollop.—"Ah, *now* 'tis clear."—*Old Play.*

To the Editors.

Gentlemen,—The editor of the *News* must surely be beside himself with wrath and wounded vanity, or else lost in inconceivable depths of stupidity. He has summoned to his help almost half the alphabet in letters and answers to correspondents, and has, in fact, so overdone that kind of gushing friendship which is never apparent except in a man's love for himself that few even of his own readers can fail to see through the whole thing. The abuse he vents through "Fairplay" and other of his facile puppets is elaborate and coarse but most amusing to see, and his correspondents must have more faith in him than ever Omar had in Mahomet to enable them to believe that it is gentle and all that is good to call people bad names in a meek way for telling the truth. But if it be fun to this editor I can afford it, and so, I suppose, can you, against whom, I see, he sneers for not having a "rag of a reputation" for inventing anything, for that can be no stigma, seeing that you never claimed to. To be humble chroniclers of what others have done, without envy and without partiality, is surely better than to itch after *curious* appropriations such as this collodio-chloride episode exhibits.

Poor fellow! I repeat once more the editor of the *News* must have been sorely hit—so sorely that I feel compunction, and would have refrained from molesting him again but for his imputations on me personally. I say "his," because the artlessness of his chagrin makes more apparent than ever the uniformity of hand and brain visible in the correspondence paraded in his columns. These nicknames and initials are, as some one remarked to me, like so many acting marionettes, who may sing songs in different keys, but the voice and the words are the same. Does this funny editor really imagine that anybody will believe that a dozen people in the kingdom care two straws for him and the collodio-chloride quackery, or that half as many people would take the trouble to hunt over the *Medical Directory* for my name? *That* touch, and the unctuous objurgations founded on this *new* discovery paraded, is just one degree too artful, and completes the round of indications by which the whole fabric, built so laboriously in a kind of intellectual wattle and daub, is seen to be but as a child's house of cards which the hand of a diligent workman has piled up very ingeniously, but which a breath will overthrow. Oh, but the joke is rare!

It is most true, indeed, that my name is not in the English *Medical Directory*, nor in the Scotch, nor in the Irish for that matter, and for a very good reason with which the editor of the *News*, of all men, ought to sympathise. I remember years ago the grin that spread over a worthy man's face—one high in his profession—when I asked innocently, seeing the "M.A." largely displayed (I was new to England then)—"Is the editor of the *News* an Oxford or a Cambridge man?" This gentleman was not elegant in his manners—not nearly up to the ideal standard which this model editor sets up and follows not, for he had risen from low estate—and he therefore put his finger in a peculiar manner to the side of his nose, and, with a wink and a smile, answered —"Neither, friend; he's a *Towler* man." Then there broke out a cachinnation loud and long, which the editor of the *News* may perhaps think uncalled for, and which, if he brings before his alphabet of upholders, may evolve out of the depths much highly-proper correspondence and pretty swearing in its rebuke. Ought the pseudo-academic degree of a *post* discoverer of collodio-chloride to be laughed at? Horrible thought! I shouldn't wonder if "Fairplay" has another dip into his *Child's First Book of Natural History* for an illustration of the fair beauty of the editorial attributes made fun of, and the opposite qualities of those guilty of that sacrilege. Alas! for the woes attached to dubious honour.

Now, the fact is my degree is not a "*Towler*" one, although it may be American. In so far as it is American, however, it places the editor of the *News* and myself in the same box; and, were I foolish enough to take the trouble, I would have as much difficulty in finding his name on the rolls of any British university as he had to find mine in the English *Medical Directory*, "M.A." though he be. As to our respective merits—apart altogether from the sordid question of price—I will make bold to say that I have cured fiftyfold more patients in my time than this editor has discovered processes, even if we include collodio-chloride. That, as anyone will own, is putting it modestly; but if I add that I do not, even yet, despair of curing one more of an unfortunate propensity, people may think me ambitious or over-confident—so I will not add it. But this inventing business must, indeed, be a sore weight upon this editor's mind, and it would be well if his real wellwishers could manage to relieve him of the mania.

His whine about the "long-exploded misstatements" as to the real inventor of collodio-chloride can only appear misstatements to one possessed like himself of a fixed idea which is apt to degenerate into a pernicious monomania. It can only be due to some such state of mind that letters still upholding this editor's claim with frantic assurance appear in the *News* whenever a doubt is hinted. Lest anybody should be deceived by these—a thing I very much doubt—I append to this letter the portion of M. Gaudin's article published in the *News* of August 23, 1861, which describes the process. If all that this editor discovered three years after is *not* there, except what his friends by his own admission afterwards suggested to him, then he invented the process, and the meek "Billingsgate" of himself and alphabet of marionettes is so far justified in that it is merely the expression of an injured person speaking after his kind; but if it be, then they are the greatest dirt-flingers of the age at a non inventing generation unambitious to rise by appropriations. That is the simple issue.

Substitute collodio-chloride for "photogene" and you have below an exact description of the process claimed by the editor of the *News*. It is true that M. Gaudin details how he made an iodide of silver film, or a collodio-iodide of silver; but the method for the two is, as he says, the same, only that a *chloride* is added to the solution instead of an iodide when a collodio-chloride of silver mixture is required. No tyro could by any possibility mistake the directions; and after that publication no sane person would claim the thing as a new invention.—I am, yours, &c., Henry Edward Thompson, M.D.

June 22, 1874.

"I have," says M. Gaudin, "prepared two photogenes with collodion—one with iodide, the other with chloride of silver as a basis. The photogene with iodide of silver is sometimes as sensitive as a wet collodion plate. It may, therefore, be used for taking negatives on paper in the camera, or enlarged positive prints with a short exposure and upon very large sheets The photogene with chloride of silver may be used as a substitute for ordinary positive paper for small pictures. Amateurs will find it very convenient for that purpose. The photogene with collodion exhibits different properties, according as they are applied to the glass or paper. Upon glass the image developes very feebly and superficially. The photogene is almost impenetrable to developing agents. This is unfortunate, because but for that it would realise a long-sought-for dry collodion. We shall arrive at that, no doubt, by imparting to it the porosity which it acquires when spread on paper. I prepare the collodion photogene by dissolving nitrate of silver in hot alcohol with a few drops of water, and adding this alcohol to common plain collodion. The mixture must be well shaken in order to incorporate the nitrate, which is only slightly soluble with the collodion. While shaking the bottle add to it, from time to time, a few drops of common iodised collodion, which renders it more and more opaline. As soon as the mixture, when spread upon glass, exhibits the appearance of a homogeneous film of excited iodised collodion it is ready for use, provided the nitrate of silver be in excess. * * * The collodion photogene with chloride is prepared in a similar manner, only the collodion must contain chloride of ammonium."

Anecdotes of an American Statesman.—Mr. M. P. Simons, writing to *Anthony's Photographic Bulletin*, says:—"My likeness of Mr. Clay, which has elicited so many encomiums from the press, and which you have been kind enough to criticise so favourably as a valuable likeness, is still more valuable for having associated with it a pleasing and characteristic anecdote of that great statesman. This anecdote made such a strong impression upon my memory at the time as being a most elegant *impromptu* that I am able to give it to you *verbatim*, although it has been several years since it happened. At the time I took this picture of Mr. Clay he was on a visit to Philadelphia, and was accompanied to my gallery by a Mr. Potter, one of his warmest friends. As Mr. Potter and I were about arranging Mr. Clay's drapery I asked him if he had any choice of position. His prompt answer was—'None whatever, sir. I am but *Clay* in the hands of a *Potter;* let him mould me as he will.' When I sent to you a short time since a photograph of Mr. Clay I did not think to mention that it was a copy of the daguerreotype alluded to in this anecdote. You doubtless have noticed by this picture the apparently careless manner Mr. Clay wore his shirt collar—one end up and the other down. This was caused by the habit he had of carrying his head a little to one side. But Mr. Clay at one time assigned to it quite a different cause. To a lady who asked him why he wore his collar one side standing up and the other lying down, he, in his usual pleasant manner, said—'I will tell you, madam; my wife prefers it one way and I the other, and in a spirit of compromise I wear it to suit us both.' How Clay-like! I very well recollect the great difficulty I had in getting Mr. Clay into my gallery to sit for this picture—his short stay in the city, where he was always a welcome guest, being so much occupied with his friends, and also that when he came I was engaged preparing to sit a lady. She had just finished her toilet, and was patiently waiting to be 'pictured off.' I knew that Mr. Clay had but little time to spare, and that if he had had plenty of it the committee in whose charge he had been placed were too ready to appropriate it to their own purposes. Knowing this, and fearing the consequences of a delay, I asked the lady if she would be kind enough to wait whilst I sat Mr. Clay, who was here by appointment. To this she very cheerfully consented; but Mr. Clay, overhearing the conversation, at once said, 'No; I always make way for the ladies. I can wait.' I relate this little incident to show the kind feeling and true politeness of Mr. Clay; for, though he was so very much pressed for time, yet he was not willing that anyone should be kept waiting on his account. The lady appreciated this, and insisted upon Mr. Clay sitting first."

Sandarac and Benzoin Varnish.—F. M. Spencer, in the *Photo. Mosaics*, writes :—"It occurred to me that a few words and a formula for varnish for positives and negatives might help some troubled brother. Having experimented with a variety of gums to practically ascertain their qualities for the purpose, I came to the conclusion that sandarac and benzoin in equal parts were best suited for all kinds of everyday work. Sandarac alone I found to make a hard, glossy varnish that would not soften by heat, but was sure to crack and spoil the picture after a few months, or even weeks in many instances. Benzoin alone made a tough, permanent, polished film, but would soften in the sun, so I thought I would combine the qualities of the two. Having found equal parts to be the right proportion I have settled on the following formula :—

Alcohol (95 per cent.)	16 ounces.
Gum sandarac..	800 grains.
Gum benzoin	800 ,,

Dissolve by frequent shaking, and allow it to stand two or three days to settle; decant or filter the clear solution and add four ounces of chloroform, and you have as good a varnish as an operator can desire. One drachm of oil of lavender may be added to the above quantity if desired, but as it is slowly volatile it seems to be an objection, and in no way improves the varnish. I usually warm my plate and dry by a gentle heat. To get a surface for retouching varnish a sheet of glass, and, when hard and cold, start a spot upon it with a little powdered resin, after which the ball of the finger will be sufficient to gather the flour of varnish, to roughen the varnish wherever it may be needed, and by this method I obtain the best possible surface for the pencil; but it is not *necessary* that the surface be ground, I have worked nicely upon the polished surface. I recommend this varnish after an experience with it of three years. Try it."

EXCHANGE COLUMN.

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

An 11 × 9 inches glass bath will be exchanged for a good watertight half-plate bath.—Address, William Barrow, photographer, Llandudno, Wales.

ANSWERS TO CORRESPONDENTS.

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

⁂ Registration Notices in our next.

Paraffine.—The information will be given next week.

Photo. (Cork).—There is no agency. The best way is to make known your requirement through our advertising columns.

B. J.—The lens marked No. 4 will prove to be the most rapid. Our reason for arriving at this conclusion is the simple one of estimating the relation of aperture to focus.

T. Evans.—Any enameller in Clerkenwell will prepare for you tablets of the kind you require. We refer to single specimens; of the wholesale trade in this description of work we know nothing.

W. Macindoe.—There is no work specially devoted to photolithography—certainly there is no publication of the nature of a manual. Most of those referred to by you as adopting photolithography as a profession have acquired their information from occasional articles on the subject which have appeared in our pages.

P. R. H.—We advise you to obtain the specification of the patent (which can be had for fourpence) and compare the process there described with one of a similar character described by Mr. M. Carey Lea several years before, and which, owing to that description, is now public property and unfettered by any restriction.

W. S. S.—1. A lens of eighteen inches focus will give by far the best picture. By using the seven-inch lens it will be necessary to enlarge the picture.—2. To obtain the size of image wanted a twenty-two inch focus lens will be required.

Professional.—We cannot advise in the matter, the subject being one for lawyer. If you have undertaken to teach your apprentice the principles and practice of photography in all its branches, and have failed to fulfil your engagement, then it appears to us that he is somewhat justified in the course he has adopted.

G. B.—To obtain greater intensity in the negative—which for your purpose ought to be almost, if not altogether, quite opaque in the lights—allow the mercury to remain on the surface until it becomes white. Wash thoroughly, and then apply the diluted sulphide of ammonium. In this way you will obtain an intensely-deep brown deposit.

Markings on the Film.—During the last three or four weeks we have received an unusual number of complaints from photographers relative to surface markings on the collodion film. Three have written to us to say that by adopting a suggestion we made in our column of "Answers to Correspondents" a short time since—namely, to add a few drops of water to the collodion—they have got entirely rid of the annoyance.

Senex.—The indistinctness of the image arises from its being out of focus. From your description of the lens, and taking into consideration its long focus, we imagine that it has been intended to form the object-glass of a telescope. As objectives of this kind are always over-corrected for colour the visual and chemical foci are not coincident, and hence, in making use of it for photographic purposes, due allowance must be made for the difference between them. Having made such allowance it will then produce sharp images.

Ascot.—It is not necessary that so much care be bestowed upon the preparation of a silvering solution. Oxide of silver dissolved in a solution of cyanide of potassium is recommended by nearly all the writers on this subject, while some advise that cyanide of silver obtained by careful precipitation be used instead of the oxide. We have had much experience with both, and also with one prepared in a far simpler and more economical manner, viz., by pouring into some old nitrate bath solution enough of a rather strong solution of cyanide of potassium to redissolve the copious precipitate of cyanide of silver which is thrown down. As soon as the liquid has become quite clear—which it does when enough cyanide has been added—it is ready for being used for electroplating, although it will be so strong as to render it desirable to add about four or six times its volume of water. Silvering solution prepared in this way will remain good for years.

Anthony's Prize Pictures.—Through the courtesy of Messrs Anthony, of New York we have been afforded an opportunity of carefully examining three of the portraits which obtained the prizes so liberally offered by Mr. Anthony. Two of them are by Mr. Gutekunst, of Philadelphia, the other being by Mr. Barhydt, of Rochester (U.S.). For exquisite modelling and delicacy of execution we have never seen any pictures finer than the two charming portraits of children by Gutekunst; and we imagine that if a few pictures of this class were sent to the annual exhibition of the Photographic Society of London they would cause a sensation. These prize pictures may be seen at our Publishing Office.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 30........	Liverpool Amateur............	15, Old Hall-street.
July 1........	Edinburgh......................	The Hall, 5, St. Andrew-square.

METEOROLOGICAL REPORT,

For two Weeks ending June 24, 1874.

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

These Observations are Taken at 8.30 a.m.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
11	30·24	W	51	58	77	45	Fine
12	30·37	E	47	54	64	44	Fine
13	30·40	NE	47	52	62	42	Cloudy
15	30·54	E	49	53	61	42	Fine
16	30·33	NE	51	53	63	46	Dull
17	30·13	E	50	52	—	46	Raining
18	30·32	E	52	54	60	47	Dull
19	30·34	E	48	51	66	41	Dull
20	30·25	E	53	55	58	46	Dull
22	29·98	SE	51	56	77	44	Fine
23	30·04	SW	57	61	72	49	Fine
24	29·88	W	50	53	—	49	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 739. Vol. XXI.—JULY 3, 1874.

A DRY ATMOSPHERE A CAUSE OF IMPERFECT PRINTS.

During very dry weather many photographic printers experience difficulty in obtaining prints free from an objectionable mealy tone. Without, however, changing in the least degree their method of working, this mealiness disappears when the intense dryness of the atmosphere is replaced by a medium amount of humidity.

It is not sufficiently well known that printing paper when perfectly desiccated does not answer so well as when not thoroughly dried. Every photographic experimentalist is aware that moist chloride of silver is far more sensitive than dry chloride, and that this sensitiveness is greatly increased by the presence of a slight excess of nitrate of silver—a fact very clearly demonstrated by Herschell and his *confrères* at a period when photography was very youthful. Indeed one of the very first applications of glass as a medium upon which to receive a photographic image was by placing a plate at the bottom of a vessel of water containing chloride of silver in suspension, and allowing the atoms to settle slowly down, so as to form an uniform layer upon the surface, which, however, was not sensitive until subjected to the action of nitrate of silver. Certain photographic surfaces, such as bichromated films, are more sensitive when dry than when wet; and the same may be said of certain conditions of surface upon which bromide of silver forms the sensitive material.

Between the chloride of silver upon albumenised paper when used absolutely dry and the same when not quite freed from moisture there is, as we have said, a great difference—the former yielding a print slow to tone, and which gives, after all, a mealy image, while the latter is free from this imperfection.

The following experiment, which was conducted by a professional friend of much experience, will prove of great value to those who meet with any toning difficulties, more especially in dry weather; and it will prove an answer to several correspondents who have recently been troubled with mealiness and want of brilliancy in their prints. The gentleman in question was, a few summers ago, nearly driven to distraction in consequence of this annoyance. He had recourse to different samples of paper, new baths, and various methods of treatment in order to exorcise the maleficent power by which he was subjected to so much trouble; but all without avail. Observing the marked similarity of the behaviour of his prints with some printed upon paper preserved for a short time in a Marion preservative case, he was led to reflect on the probable cause.

Sensitive paper preserved in a Marion case becomes thoroughly dried owing to the presence of a powerful desiccating agent, such as chloride of calcium, and in many instances it fails to yield a satisfactory print unless a moderate amount of time shall have been allowed to elapse between its removal from the case and its exposure under the negative. Bearing in mind that the atmosphere had been unusually dry for some time previous to his encountering these printing difficulties, it occurred to him that not only would the paper be abnormally dry, but the printing-frames, pads, and all their surroundings, would be in a similar condition. To test this point the following experiment was tried:—A coal cellar in the lower part of the house was subjected to a thorough syringing with cold water, and in this damp chamber a selected and marked dozen of printing-frames, with their pads, were placed for a night. In the morning a certain marked portion of the ordinary sensitised albumen paper was also placed in the cellar for about half-an-hour, or until it had lost that extremely horny surface by which it was characterised when placed in the damp room. The materials, thus prepared, were now handed over to the printer, who was not slow in discovering that a marked improvement was the result. The prints obtained under the pre-existing circumstances were slow to tone, and as objectionable as before; while the other paper which had, with the frames and pads, been subjected to the influence of the moist atmosphere printed brilliantly and rapidly, and acquired a fine tone in the gold bath. All the samples of paper previously laid aside as bad were again tried under these changed circumstances, and found to be very excellent.

This experiment requires no comment. Those who have recently written to us complaining of the so-called inferior quality of albumenised paper now being sold should repeat this simple experiment, and, as a consequence, they will probably find that the real cause of their failure lies in the long-continued dryness of the atmosphere.

FLUORINE AND ITS SALTS.

It has been proposed to use the element fluorine—or, rather, we should say, some of its compounds—in photography. We will give a short *résumé* of all that is known of this, the most mysterious of the simple bodies. Although very generally diffused in nature, so difficult is the element itself to prepare that almost everything we know about it is by inference and analogy; in fact, the most important contribution towards our knowledge in this direction emanated but a few years since from the pen of Mr. Gore. Its action upon almost every material we can employ in the form of vessels restricts greatly any experiments that can be performed in connection therewith. The equivalency of fluorine even has been a matter of dispute, but every analogy seems to place it amongst that well-known halogen group—chlorine, bromine, and iodine.

The only reason for considering fluorine as a member of another group is its apparent predisposition to form double salts (therefore it would from this point be probably diatomic), and also the divergence as regards the analogy of the silver salts. This last point particularly interests the photographer; because, until the position that fluorine holds in connection with the silver compounds is understood, its action can hardly be controlled.

We have stated that this element is very generally diffused in nature; but, although this is the case, it ordinarily escapes observation. From the fact of the difficulty attending the detection of small quantities and its great property of combining with silica, which is largely present in almost every apparatus in use, it escapes observation. We are familiar with it in the well-known mineral, fluor spar.

This country is particularly rich in fine specimens of crystals of fluor spar; cryolite also—the double fluoride of sodium and aluminium—found in immense beds in West Greenland, and used for the production of the metal aluminium and soda salts, is a great source of fluorine. As illustrating the general diffusion of fluorine in nature we may mention that it is a universal ingredient of bone, either human or otherwise.

The fluorides usually found in commerce, we are sorry to say, are generally extremely impure; and in all photographic experiments made with them it would be better to prepare them for oneself, or get the assistance of some first-class operating chemist. The probable cause of this impurity is that, except for engraving upon glass, the compounds of fluorine have hardly any application.

From the recent researches of Gore (*Proceedings Royal Society*, xvii, 256) the hydrofluoric acid would seem to be perfectly analogous to hydrochloric, and, by inference, fluorine with chlorine. He has determined the molecular weight, and really seems to have put the question of the atomicity at rest. In his paper he enters very fully into the reactions of fluoride of hydrogen, or the hydrofluoric acid, upon other substances, and these experiments form the basis of the following remarks:—The chemical reactions which can affect the photographic question may be shortly enumerated. They were determined by Mr. Gore in connection with the anhydrous acid, but apply equally to the dilute acid, except as regards intensity. Nitrates are, as a rule, not attacked by hydrofluoric acid; whilst lead, barium, and potassium salts are decomposed. Some chlorides are unaffected; but the chlorides of phosphorus and antimony—chlorides of the alkaline metals—are violently decomposed by the hydrofluoric acid, and the chlorates are also decomposed with evolution of chloric acid. Bromides behave in a similar manner as regards this acid, potassium bromate evolving bromine. Although some of the iodides remain unaffected the alkaline iodides are violently decomposed by the strong hydrofluoric acid. All carbonates are decomposed by hydrofluoric acid.

There are many other reactions described, but none of any apparent interest to the photographer, if we except, however, the great affinity which fluorine seems to possess for the element silicon and its compounds. The very strong acid is highly dangerous; and even an acid containing thirty per cent. should be handled with caution, as it is very corrosive.

We will now give a short account of the most interesting fluorides with a view to their photographic bearing.

Fluoride of Hydrogen (Hydrofluoric Acid), H F.—Gore says that this acid, when found in commerce, is extremely impure; and, as most of the fluorides are prepared therefrom, it is necessary to purify it. He gives the following process for purifying it:—Sulphuretted hydrogen is passed through the commercial acid until it smells distinctly of that gas. The sulphuric and silicofluoric acid present are then neutralised with a little carbonate of potassium, and the liquid is decanted from the resulting precipitate; removing the excess of $H_2 S$ by a little carbonate of silver, filter and distil the filtrate from a lead retort with a platinum condenser. Its chemico-electric relation to some of the most important metals is, when tried with acid of thirty per cent., in the following order:—Zinc, magnesium, aluminium, cadmium, tin, lead, silicon, iron, mercury, silver, copper, platinum, and gold.

The following is a description of some of the principal salts:—

Fluoride of Calcium, $Ca F_2$.—This is a very insoluble salt, got by precipitating the soluble fluorides by chloride of calcium. It is, however, slightly soluble, according to Wilson—namely, one part in two thousand parts of water. It dissolves in free hydrofluoric or hydrochloric acid, and is reprecipitated on adding ammonia. The native calcium salt is fluor spar.

Fluoride of Cadmium, $Cd F_2$, is another very sparingly soluble salt. It is more soluble in acidulated solutions, but is almost practically insoluble in neutral solutions.

Potassium Salts, K F.—The most soluble fluoride known. It is deliquescent and very soluble in water. An acid salt may be also obtained, according to Berzelius, having the composition $K H F_2$.

The Sodium Salt, Na F, crystallises in white anhydrous cubes, which are soluble in twenty-five parts of water.

Fluoride of Silver, $Ag F 2 H_2 O$, or $Ag F H_2 O$, is a soluble salt made by dissolving carbonate or oxide of silver in hydrofluoric acid. This solution yields the fluoride on evaporation either in a vacuum or by concentration over a water bath. The dehydrated crystals, when left for some time in the vacuum or over oil of vitriol, are said to be converted into a yellow oxyfluoride (Ag F, Ag HO). The same compound is also formed when a solution is strongly concentrated over a water bath. It forms brass-yellow, crystalline spangles which dissolve in water, with the separation of oxide of silver. The solution is also precipitated by carbonic acid, whereas the fluoride is not. As the result of the decomposition simply seems to consist in the elimination of hydrofluoric acid and the production of a "sub-fluoride" of silver, it is a question how far the actinic influence is concerned in its formation.

This subject requires further elucidation, particularly as it might throw some light upon the question of the decomposition of the iodide, bromide, and chloride of silver. Fluorides have been proposed as accelerators, and it is evidently in a manner connected with the relative decomposing action of this substance on the halogen salts of silver. The results, however, have been somewhat contradictory.

EXPERIMENTS WITH AN OLD BATH.

Our American brethren are undoubtedly an enterprising people, and know, perhaps better than any other nation, how not only to "make ends meet," but to secure a gradually increasing balance on the right side. The inventive faculty has amongst them been largely cultivated, and they are not slow in turning to account every discovery they make, nor always very particular as to the nature of the invention they introduce. "Things new and *old*" are equally laid under contribution, the new being generally preferred when it can be had; but when the inventor lags behind, an old idea dressed in a new garb is boldly made to do duty as the "latest discovery" or "last new invention." A visit to any ironmonger's or tool dealer's establishment will show that to this enterprising turn of mind we are indebted for a large number, especially, of the little things which go so far to increase our comfort in the mechanical direction generally, and an examination of our advertising columns will make it abundantly clear that photographers have not been forgotten.

The latest novelty in this direction is what the inventor is pleased to call "metallic precipitating bars—a new method of purifying silver solutions;" and the method of using them seems so simple that we need never have a bath out of order again. The directions are simply to suspend the bar by a string in a vessel into which the solution has been poured, and "in twenty or thirty minutes the silver will be all precipitated, not one grain need be lost—two or three washings, and dissolving with nitric acid, reducing to the strength you require with water." This, of course, seems quite clear; but as we had some doubts as to its accuracy, and as a friend had kindly handed us a bar for the purpose, we resolved to make a few experiments, the results of which we think may be of some use and interest to our readers.

The "bar," as handed to us, is not really a bar at all, but a piece of greyish white metal, which looks suspiciously like our old friend, the zinc rod, bent into a U shape, like a horse-shoe magnet, with its limbs parallel, for convenience of hanging it by the string, and weighing 10,810 grains. The bath on which our experiments were to be made was an accumulation of 170 ounces, and contained, as we found by decomposing a portion with sodium chloride, sixteen grains in each ounce.

As soon as the bar was placed in the solution the precipitation of the silver commenced; but in a few minutes the action stopped, as the silver adhered to the surface and prevented the continuance of the action. A shake, however, was sufficient to detach it, and then the action was renewed. At the end of thirty minutes—the maximum time required according to the directions—the liquid was tested by sodium chloride, and found to be still rich in silver. The test was repeated hour after hour for three days, and even then the whole had not been thrown down. As, however, for the last twenty-four hours there had been no perceptible diminution in the quantity of chloride formed by the test, we concluded that the bar had done all that it could, and so removed it and had it carefully weighed, when we found it had lost 820 grains, which, as the combining proportion of zinc is 65·2 and that of silver 108, represented, or ought to represent, about 1,362 grains, or a little more than three ounces of metallic silver. The liquid and deposited silver were then poured into a filter, and when the former had all passed through the latter was washed till neither HCl or NH_4 produced a precipitate, showing the absence of both nitrates of silver and zinc. The powder was then dried and found to weigh 1,380. The filtered liquid was then treated with sodium chloride, which threw down a quantity of silver chloride, weighing, when dried, 230 grains—equal to 173 grains of metallic silver. This was not much, certainly, but still hardly consistent with the statement of the inventor of the bars that "not a grain need be lost." To make sure of the nature of the metal of which the bar was composed the solution was then subjected to the usual group tests, which, as we had suspected, showed nothing but zinc.

The next step, according to the instructions, was to dissolve the precipitated and washed silver in nitric acid, and dilute to the required strength; but, of course, we knew better than to do anything of the kind. The object of the whole operation was to get rid of the organic impurities and superabundance of silver iodide; and as they had been precipitated with the silver they would, of course, have been again dissolved along with it, and we should have just ended where we commenced. As, however, both the iodide and the organic matter are easily reduced by heat, we placed the powder in the crucible of one of Fletcher's ingot moulds, and, with the heat from one of his hot-blast blowpipes, in less than ten minutes got two fine ingots of chemically-pure silver, weighing nearly three ounces troy.

Our readers may suppose that our next step was to dissolve the ingots in nitric acid and so convert them into nitrate of silver; but we did not do so. We have long passed the stage at which a photographer believes that he can do that as well or as profitably as those whose business it is, and so we simply handed them to a refiner, who within a few hours sent us their value in cash, at the rate of six shillings and eightpence per ounce.

Although much has been written on the saving of wastes, and many workable methods have been suggested, we know, from an extensive acquaintance with professional photographers, that in many cases the attempt is made in a very perfunctory way, and in quite as many it is not made at all; and we shall hail with satisfaction the introduction of the precipitating bars if they be the means of turning general attention to so desirable an object. In even a very small establishment the cost of a blast blowpipe and ingot-casting arrangement—only twenty-two shillings—would be repaid by a very few weeks' saving, while in some establishments with which we are acquainted the actual waste would give a handsome salary to an assistant, and leave a large margin of profit to the employer.

THE "PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN."

In order to prevent our readers being startled by the above novelty we hasten to explain that it is only an old body with a new name. At a meeting of the Society formerly known as the "Photographic Society of London," held last Tuesday, at which only three or four private members were present, a portion of the officials deemed themselves warranted, not only to assume the above high-sounding title, but also to adopt *en bloc*, without the formality of discussion, a new constitution for the old Society.

That it was necessary a new constitution should be framed was sufficiently clear from the rebellion which had arisen among the independent members; and the marvel is that a system involving the government of the Society, the management of its exhibitions, and the distribution of medals should have been permitted to remain so long in the hands of a practically self-elected and self-maintaining "clique." That the efficiency of what should have been the most important Society in the kingdom was impaired, and that it ceased to retain its proper weight and authority by this systematic bad management, are now admitted facts; and when the independent members claimed that the whole body should select whom they pleased to govern their affairs instead of a narrow section, the wretched system collapsed. The "clique," however, with a persistency worthy of a better cause, struggled hard, even risking the breaking up of the Society rather than surrender their power; but they were ultimately obliged to succumb. A section of this party still remains in authority and has managed in the new constitution to curtail some of the advantages for which the reformers contended. It is, perhaps, sufficient that the old wretched system has been abolished, and it will be the fault of the members if the new organisation is so perverted by "management" and "wire-pulling" as to lead to some of the evils of the past system.

What we chiefly complain of is the impolicy, not to say the indecency, of less than a score of persons assuming the authority of passing a new code of laws to govern some three hundred members. It was of the utmost importance for the consideration of so grave a subject that the new code of laws should be a sufficient time in the hands of members, so that they might be well considered by them, that ample notice should be given to every member, and that the time selected to hold such an important meeting should be at a period when photographers would be able to attend. Had these conditions been complied with no exception could be taken to the conclusions come to at such a meeting.

Instead of so acting, the Council seem to have studiously ignored all these necessary conditions. Only a few days were given to consider the new code, which was enclosed in the Society's journal. The contents of this journal were published before it itself was issued, and was, therefore, an additional reason why it might remain in its usually unread condition. The meeting was called at the end of June—a period of the year when it is notorious that photographers are absorbed in their avocations, and, therefore, peculiarly ill-suited to secure a full meeting. Finally: the postal-card notice of the meeting, which for months past members had been accustomed to receive, was, either from accident or design, omitted to be sent out. These circumstances, unitedly, fully accounted for not so many private members assembling as might be counted on one hand. All these things were urgently pointed out at the meeting, and an appeal was made to postpone the consideration of the subject; but a section of the Council, apparently seeing they had an opportunity which they might never secure again, urgently determined to carry their point.

This is how the ruling section, which brought discredit by its "management" on the "Photographic Society of London," commences its new career of "managing" the "Photographic Society of Great Britain."

In a leading article in our number for the 12th ult., we described a method of improving landscape negatives by grinding the whole or a portion of the glass by means of emery powder, with which process we associated the name of Mr. Valentine. We now, in justice to a young artist who occupies a high position in photography, Mr. William Bedford, supply an omission in that article, which we do by stating that not only has the method there described been successfully adopted by Mr. Bedford, but that he kindly described his *modus operandi* in our Almanac for 1873. We were aware, and stated so in the article, that the method which we then commended had been published, and now with pleasure supply the omission we then made in not stating by whom it was so published. The question, however, still remains open whether the balance of advantages will be found to lie on the side of the method of grinding the back of the negative with emery, so as to give it a biting surface on which to work with the blacklead pencil, or in giving the requisite "tooth" by the application of a matt or "ground-glass" varnish, some samples of which, we know, give an exceedingly hard film which bears being worked on with the plumbago pencil without abrasion.

NOTES ON PHOTOGRAPHIC HYGIENE.

No. II.

All chemical substances are more or less capable of affecting the human organism, and, properly regulated, the disturbing or active forces of many may become powerful agents in medicine. Thus many agents which, administered irrationally or in too strong doses, would at once arrest the vital forces of life, or seriously damage the system and injure health, may be actually usable as most valuable agents in arresting or curing disease.

No doubt all chemical compounds are not of the same strength, and some could hardly in any sense prove noxious to the system unless taken in impossible doses; but there are certain substances the action of which is violent in the extreme, in which the power is so concentrated that the slenderest margin suffices to divide the noxious from the beneficial. Some of these, for instance, corrode the tissues with which they come in contact; others bore their way almost instantly into the heart of the organism through their rapid absorption, and either affect the organs of the circulation or, more dangerous still, influence the governing agency of the body—the nervous system. Amongst these truly poisonous chemical substances there are some in constant use in photography, such as cyanide of potassium, nitrate of silver, bichromate of potash, bichloride of mercury, and the like.

Pursuing his remarks on this subject, Dr. Napias offers something worth study on each of these agents, which, with such alterations as may suit our circumstances, we have pleasure in laying before our readers.

Speaking of cyanide, Dr. Napias remarks that the practice which photographers have of cleaning silver spots from their hands with it is a highly dangerous one. And it is so because, first of all, cyanide is one of the most virulent of all poisons, a very minute quantity of it sufficing to destroy life. It is, besides, a poison most rapidly absorbed into the system, so that its effects are revealed with fearful promptitude, giving no time for the application of remedies. Hence it is, in the opinion of this physician, desirable that its use should be discontinued altogether by photographers, especially as it can be replaced by other substances which will do its work, if not so rapidly, as well. So powerful is it that, as photographers well know, it can work serious harm to the system by mere absorption through a cut or an abrasion of the epidermis; and the apparent immunity with which people often escape is certainly fallacious as a gauge of the danger to which weak or sensitive organisms are exposed by the free use of such a poison. Photographic workmen who handle this poison so freely are, in winter particularly, when their hands are often chapped from the wet and cold, subject to a very grave danger. These open wounds are so many doors of death.

It is usually said—"But fatal accidents are of rare occurrence;" and it is quite true. Death does not often ensue from the handling of this poison; many, on the contrary, seem to go on in the habit with the most absolute impunity. But, though this may seem contradictory to statements of danger, there are other signs often overlooked, and the examples of paralysis and of other recurrent nervous afflictions ought to make workmen pause and be on their guard. Although at no one time absorbed in sufficient quantity to cause death, or even serious or perceptible harm, the poison is not without a distinct noxious effect. Unfortunately, people are not heedful, and the occurrence of fatal accidents through careless use of cyanide have no power to correct the heedlessness; they, in fact, rather confirm it, the reasoning being that "if such an one had been as careful as we are it need not have happened." So also with suicides; cyanide, of all substances used in photography, gives the readiest means for those who are tired of the weary fight of existence to accomplish their cowardly purpose.

The symptoms of cyanide poisoning which such accidents or deeds display, or which arise from the voluntary absorption of the substance, it is well that photographers should know, and also what means are most available for checking the poison should be understood, with the mode of administering the remedy.

The first effects of a cutaneous absorption of cyanide, or of its rejection by the stomach even in very minute doses, are a sense of great oppression in the region of the heart, headaches, vertigo, giddiness, with a drowsy feeling and great difficulty of breathing, which is sometimes slow, sometimes quick, but always broken by deep sighs. If the dose be very strong, and, above all, if it have penetrated the system through the stomach, the sufferer experiences a bitter taste in the mouth, a burning in the throat and in the region of the stomach, and a desire to vomit; an unusual quantity of saliva is secreted, and diarrhœa may ensue. The pulse is at the same time feeble if not imperceptible, the sight becomes dull, and the pupils of the eyes are dilated till the balls look enlarged, while a cold sweat breaks out over the body. In the more serious cases a general prostration is visible, broken by occasional convulsions, motion becomes impossible, and sensation is lost. Death ensues in a state of syncope. And these symptoms follow each other with a fearful rapidity, hardly leaving time for observation, still less for remedy.

When restoration does take place, whether from insufficiency of dose or by skilful and prompt application of remedial measures, it is never, so to say, complete. The man does not become what he was. Nervous affections continue with great persistence and for a very long time, and consist of vertigos, difficulties in breathing, and even partial muscular paralysis.

Should cyanide poisoning ensue from an act of imprudence—such as that of an operator plunging his hand while chapped and raw into a cyanide bath—the first thing to do when symptoms of vertigo or disturbed vision appear is to wash the sores with liquid chlorine (water saturated with chlorine at an ordinary temperature), and at the same time to administer about half-a-drachm of the solution to the patient in a large glass of water, without even taking time to melt a morsel of sugar in it. Lay the sufferer then on a bed, and cover him warmly up, placing bottles of hot water to his feet and along the body. If a bed be not handy, the nearest couch will do if he be thoroughly enveloped in warm wraps. Let the windows be well opened; for air is as essential to the patient as heat, and that air of the purest too. While this is taking place some one should have been sent to the nearest chemist's for a drachm or so of laudanum. A cup of coffee or tea should be made ready with sugar and some rum or brandy, and the patient be made to swallow a cup of the one or the other with ten drops of laudanum in it and one or two teaspoonfuls of some alcoholic liquid—rum or brandy, but never *kirsch* (cherry brandy). This dose should be repeated at the end of every quarter or half-hour.

When accidents of this kind manifest from the first symptoms of the graver kind—above all, if the cyanide has been taken into the stomach—a drachm of the chlorine ought to be administered internally without a moment's hesitation, and the patient treated otherwise as above, with the addition that he should be made to breathe the chlorine frequently by saturating a cloth with it and holding it under his nose. Every precaution should be taken to keep him warm and to give him free air, and the tea or coffee with spirits and laudanum ought to be given every quarter of an hour (not, however, beyond four or five cups). Every five minutes, too, a teaspoonful of the following mixture should be administered:—

Liquid chlorine	1½ drachm.
Chloride of ammonium	½ "
Sugared water....................................	8 ounces.

As soon as some symptoms of recovery are manifested the laudanum is stopped and the mixture is given only once every fifteen minutes. Afterwards, as recovery proceeds, every half-hour. A doctor should, of course, be sent for while these things are being done, and the after-treatment left in his hands.

As an antidote to cyanide a mixture of hydrate of either a protoxide and peroxide of iron has been much extolled, and, without doubt, the remedy is a good one; but it is not a remedy which people have ready to hand, and in the opinion of Dr. Napias this cure is not so effectual, the oxides of iron being much more difficult of absorption by the system than the chlorine. Ammonia also has been praised, and justly so. If one had no liquid chlorine at hand attempts might be made to make the poisoned person breathe ammoniacal vapours, and to administer, at the same time, fifteen or twenty drops of liquor ammonia in a glass of sweetened water. The application of cold water to the spine has also been said to have been useful in cases of poisoning by prussic acid or cyanide; but it is not, on the whole, desirable to follow this plan, for it is one that would require to be guided in its application by a skilful hand, and probably only a doctor could say whether in any particular case it would be valuable or otherwise. Malapplied it might do grievous harm by inducing that refrigeration of the system most favourable to the action of the poison. The means here counselled, viz., the use of chlorine and of laudanum in tea or coffee with rum, are not only the best and most efficacious—they are also the simplest and most handy.

It must not be forgotten that cyanide poisoning takes place with extreme rapidity, and that a delay of a minute, nay even of a second, in the application of medical treatment may prove absolutely irremediable. These substances—chlorine and laudanum—are in almost every laboratory, and the means of cure is therefore ready to hand. It is at this cost, however (and it is well *to repeat it emphatically*), and only by the most rapid and energetic treatment, that there is any chance of rescue from the clutches of this poison; and, meanwhile, its use in photography might be entirely superseded by harmless agents. It is not only on account of the accidents, the cause of which and the remedy for which have just been indicated, that we wish to see this dangerous product disappear from photographic chemistry (for these accidents are usually the result of imprudence, and therefore avoidable), but it is because, all imprudence apart, cyanide is still a most perilous servant. The vapours of hydrocyanic acid and of iodide of cyanogene which are evolved from the photographic preparations into which they enter are poisonous and unhealthy to inhale. Every photographer knows that; and photographers know, too, the megrims and vertigos to which these vapours give rise. Against these lesser evils the fumes of ammonia may be inhaled with success.

NOTES FROM THE NORTH.

There is no doubt truth in the classic saying, that "some people have money and no brains, and some people have brains and no money." But it is equally true that some people have both money and brains; and, if such an one should also have the good fortune to be an amateur photographer as well, he is blessed with large opportunities of doing good amongst a highly-deserving and always very grateful class. His tastes and means enable him to surround himself with all that is dear to the heart of a votary of the camera, and he is never happier than when he can gather round him a few kindred spirits to admire his negatives and join with him in emulation in the production of something better.

From such a happily-placed amateur I, along with some of the office-bearers of the Edinburgh Photographic Society, received an invitation a few days ago to spend a day, see his appliances and work, and try our cameras together. The day, unfortunately, was not favourable for outdoor work, but we found plenty of entertainment inside. The place, although within sight and almost within hearing of the busy hum of the city, might, so far as picturesque beauty is concerned, be in the midst of the highland hills. The garden is laid out in the old Dutch style, and is rich in quaint sculpture in the shape of curious fountains, figures, and slabs, and contains a perfect labyrinth of tall, thick yew hedges. The grounds are extensive, embracing almost every variety of scenery, including a temple-crowned hill, a fern and wild hyacinth-clad valley, trees of all ages and sizes, precipitous rocks, and a lake surrounded with trees whose branches overhang its banks, bathing themselves in the water and casting those charming reflections which gladden the heart of the photographer.

Of course, in consequence of its proximity to the city, Ravelston is not open to the general public; but its liberal proprietor assured us that the camera and tripod would always be a sufficient passport, and act on his gatekeeper, as did the "open sesame" of the eastern tale.

Our host, who is an amateur mechanic as well as photographer, conducted us first to his workshop, of which he is very justly somewhat proud. It is, indeed, no trifling affair, being large enough to give working room to at least a dozen men, and contains such a number of the most modern tools by the best makers—including a steam-engine to drive them—as would enable him to start as an engineer in a rather extensive way of business. Being, however, very photographically inclined, I was, of course, more interested in the work done, so far as it related to photographic appliances, than in the tools instrumental in the doing of it. Being so minded, I turned with considerable interest to examine several little dodges, the use of which had added much to his comfort and convenience.

I need not say anything about the large stock of lenses. Every amateur knows that his own collection is limited solely by his ability to purchase, and that, if he could afford it, he would at once order every new lens introduced. Nor need I say anything of the ingenious way in which the lathe had enabled our host to make adaptors by which any of the lenses could be fitted into any one of his several cameras, my object being rather to describe what seemed to me to be either new, or simplifications of old, appliances.

A simple stand or carrier for cleaned or albumenised plates first attracted my attention. We all know the trouble of removing a batch of cleaned and, especially, albumenised plates from one room to another. The cleaned or albumenised surfaces must not be touched by the backs of the neighbouring plates; and so they must be removed, a few at a time, at the risk of either injuring the surfaces or, perhaps, smashing them altogether. The stand consisted of a piece of quarter-inch wood, about twelve inches by six. Into the centre of this was mortised a piece of the same breadth, and fourteen inches long, so that it looked like the letter T inverted, with an oblong hole cut in the end of the upright which served as a handle by which the stand could be carried. On the flat board, on each side of the upright, there were fixed pieces of the grooved gutta-percha used for the ends of plate-boxes, the grooves running at right angles to the length of the board. As the plates are cleaned, albumenised, or prepared, they are placed, one by one—the lower end in one of the grooves, and the upper end resting on the upright. In this way the plates are separated at the bottom by the breadth of the groove; and, as the prepared or cleaned surface does not come in contact with the one next to it, two or three dozen may easily be carried from one place to another without danger of injury or breakage.

Another very useful and simple piece of apparatus was a developing-stand for dry plates, especially useful in cases of protracted development. It consisted of a piece of turned wood, in shape very much like a funnel with the tube cut off, and in its place a circular disc of four or five inches in diameter, having on its upper surface three small pieces of gutta-percha on which the plate lies. This funnel-like cone rests on the rounded apex of a somewhat similar cone, but turned to a considerably smaller angle, and having its base loaded to make it steady. The upper cone is also loaded, round what may be called the mouth of the funnel, so as to make it hang in such a position as to keep the plate quite level. Mounted thus on a pivot, as it were, the plate is kept in motion by the least touch, and need never be brought into contact with the hand unless to examine the progress being made. Such a stand may be constructed for a few pence, and is more efficient than anything of the kind I have ever seen.

Another very useful arrangement was intended to facilitate the changing of dry plates from the dark slide to the plate-box, and *vice versâ*. It consisted of a sheet of millboard fixed, to give it rigidity, to a wooden frame. To opposite corners of the frame were attached the four ends of two pieces of chair web, long enough, when placed on the head at the centre where they crossed, to suspend the thus extemporised table at a convenient working height in front of the operator. The dark slide and plate-box are placed on the table, and over all, including head and shoulders, is put a dark hood, which is loosely tied round the waist. A piece of double yellow cloth inserted in a convenient place gives sufficient light; and in this way the required changes are easily and comfortably made. The millboard-mounted frame is about two feet square, and somewhat bulky to carry; but that objection could easily be overcome by making it of thin laths glued on cloth, so as to roll up, the necessary rigidity being got by two thin wooden rods in a way which any reader may readily devise for himself.

Photography and plate printing, or printing in greasy ink, are becoming so intimately connected that any out-of-the-way information concerning either must be equally interesting to the practitioner of both branches of art. Here is a scrap of information not generally known, which may probably turn out of use to somebody. It may be relied on as correct, as I have it from, perhaps, the oldest and most experienced plate-printer and careful experimenter and observer in the country. It is this:—Of two prints, taken from copper and steel respectively in the same ink, the one from copper will dry in a day or two, while the other from steel will not dry for months, or even years. Why is this? The ink used for high-class work is generally made by the printer, and consists simply of "Frankfort black" ground in *burnt* oil, and is the material referred to in this note. The rags used to wipe the ink from the copper are generally dry and hard after lying aside all night, while those that have been used on the steel remain quite soft for many days. John Nicol, Ph.D.

ON SYMMETRY IN DOUBLET VIEW LENSES.

I have always believed the symmetrical form (in which the front and back lenses are equal, and the stop midway between them) to be better than the *unsymmetrical* form (in which the back and front lenses are *unequal*, and the stop dividing the space between them in the ratio of their focal lengths), for a reason which I will point out. Those opticians who have adopted the symmetrical form may possibly be wrong and the others right, and my reasoning may be worth nothing; but, be that as it may, my readers shall have it to consider and weigh for themselves. Then, if anyone can prove it to be wrong, I will thank him, and renounce the opinion which I have held for so many years, and which facts seem now to be confirming.

Before proceeding to the discussion of symmetrical *versus* unsymmetrical doublets I will offer a few words on the four most important properties which an achromatic view lens should possess. These are—1. Flatness of field. 2. Freedom from distortion. 3. Freedom from flare. 4. A large circle of light.

In his endeavour to combine these four important properties in an achromatic view-lens the optician does not concern himself much about spherical aberration, because he knows that this will be sufficiently reduced by means of a stop, which is never required in landscape photography to exceed in diameter the one-twentieth part of the equivalent focal length of the lens. This being understood, we may confine our attention to the above-named four important properties which an achromatic view lens should possess.

1. *Flatness of Field.*—This property will obviously require that the oblique pencils, after refraction through the lens, should be longer than the central axial pencil, in order that their foci may fall *upon* the margin of the flat plate, and not in *front* of it. In order to bring about this result we must make use of the following law of optics, viz.:—When the oblique pencils are incident obliquely upon the con*cave* surface of a lens the field is flattened; but when they are incident obliquely upon the con*vex* surface the field is made rounder.

The above is true whether the pencils pass from air into glass or from glass into air. The amount of lengthening or shortening which oblique pencils receive in obedience to the above law (the demonstration of which is given in a back volume of this Journal) depends upon the value of the refractive index of the glass, the angle of obliquity of the pencil, and the length of the radius of the surface. The actual quantity by which they are lengthened or shortened is a fraction the numerator of which depends upon the first two quantities and the denominator contains the radius only. Thus, if we call the refractive index μ, the angle of incidence ϕ, and the radius r, the greater the values of μ and ϕ, and the less the value of r, the more the oblique pencil will be lengthened or shortened, as the case may be.

This principle leads us at once to the deep meniscus view lens with the stop in front. The *concave* front surface flattens the field, and the *convex* back surface gives it roundness. But, by putting the stop at a particular distance in front of the lens, the most oblique pencil, after refraction, emerges from the convex surface in the direction of a normal, so that the angle of incidence vanishes, the shortening effect of the convex surface is reduced to zero, and the lengthening effect of the concave surface receives no diminution. A lens of this form may therefore give a perfectly flat field for distant objects by making r sufficiently small.

The reader will observe that this is true of a single piece of glass, and has nothing to do with the lens being achromatised in any way. In fact, in the case of an achromatic deep meniscus, composed of two lenses cemented together, the interior curve of contact, whatever that may be, has but little influence on the curvature of the field, owing to the very small value of μ (the refractive index between one kind of glass and the other). It is the deep hollow *external* curve of the meniscus which does very nearly all the work of flattening the field.

When the stop is placed nearer to the lens than the position just assigned to it the shortening influence of the convex surface upon the oblique pencils is brought into play, and this gives the field less flatness. By putting two deep meniscus lenses together, with a stop between them, we can still have a flat field; but the flatness will be reduced by bringing the lenses too near together.

2. *Freedom from Distortion.*—This property cannot be secured by means of a single lens having a stop in front. We are obliged to have recourse to a double combination in order to secure it. I will state presently the law which must be observed in regard to the position of the stop, which must be between the lenses.

3. *Freedom from Flare.*—I decline for the present entering into this subject, but will discuss it on a future occasion in a separate article.

4. *A Large Circle of Light.*—Unless the circle of light which is covered by a view lens be larger than the diagonal of the picture, the horizontal line cannot be raised or lowered by means of the slider which carries the lens without rounding off the corners of the picture. This is a great inconvenience, since it necessitates the use of either a round or a swing front to the camera.

I now come to the main question which I propose to discuss in this paper, viz.:—Is the symmetrical or the *un*symmetrical form of doublet the best?

In either case the lenses must be deep menisci; they must be placed with their concave sides inwards; the stop must divide the space between them in the ratio of their focal lengths; and the lenses must, of course, have diameters which are proportional to their focal lengths. There is no escape from these conditions without sacrificing one or more of the four important properties which the compound should possess. For instance: if you alter the curves of either of the lenses and make them shallower you sacrifice some of the flatness of field; and if you put the stop in the wrong place you introduce distortion.

Now, the deep meniscus doublet is so bad a form of combination as regards spherical aberration that we cannot use it with a stop which is larger than about one-half of the *smaller* of the two lenses. Let us, then, take a deep meniscus suitable for the posterior lens of a doublet, and put a stop half its size at a suitable distance in front of it; then see whether the front lens ought to be larger than, or equal to, the posterior lens (for it cannot be *smaller* than it, because the stop would then be too large for it).

In order to fix the ideas let the posterior lens be twelve inches focus, and the stop a quarter of an inch in front of it. If the doublet is to be symmetrical the front lens will also be twelve inches focus, and a quarter of an inch in front of the stop. The equivalent focus of the doublet will then be about six inches in round numbers. But if the doublet is to be *un*symmetrical, let us make the front lens twenty-four inches focus, and put it *half*-an-inch in front of the stop. The equivalent focal length will then be about eight inches in round numbers.

It follows, therefore, that the symmetrical doublet, which will work with the *same* sized stop as the *un*symmetrical one, will have a shorter focal length, in the proportion of 6 : 8, and will therefore be nearly twice as quick a lens, the times of exposure with the two instruments being as 36 : 64.

From this it appears that with a given focal length of combination it is better to make the front and back lenses equal than to make them *un*equal, because when they are made equal the compound will work with a larger stop (the law being that the size of the stop must be in proportion to the size of the *smaller* of the two lenses).

Suppose, for instance, I were required to make a doublet having ten inches equivalent focal length: if I make the front and back lenses equal, and give to each of them a focal length of twenty inches, the combination will work nearly twice as quick as if I make one lens small, with a focus of fifteen inches, and the other lens large, with a focus of thirty inches; for the fifteen inches focus back lens of the *un*symmetrical doublet will not take so large a stop as the twenty inches focus back lens of the symmetrical doublet. The diameters of the stops of the two combinations will be, in fact, as 3 : 4, and the amount of light in the image as 9 : 16.

Should it be urged, in reply to this reasoning, that by altering the curves of the small lens of the combination you may make it work with a stop larger than its half, I reply—"So you may; but in that case you introduce roundness of field. You may alter the curves of both the front and back lenses of a doublet if you choose, and make it work with full aperture by converting it into a portrait lens; but what becomes then of its flatness of field?" I think I have now proved that the symmetrical form of doublet is the best; for it has been found practically that that form has no *dis*advantage to act as a set-off to its advantage of comparative quick working.

Thomas Sutton, B.A.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I do not feel quite clear about the scratching of photographs said to result from the use of the hot burnisher *à la* Weston. I was shown a *carte* portrait with a deep scratch in it, and was told that *that* was caused by the burnisher. But the explanation, elicited by request, as to the presumed cause of scratching was quite unsatisfactory to me. It was something to the following effect:—"You know all about nature printing?" said the complainant. I bobbed my head in admission of the soft impeachment. "And how even soft feathers, as well as hard gelatine and albumen, can be impressed on hard metal?" I again nodded acquiescence. "Well, that's it." "That's *what?*" I inquired. "The albumenised paper being dragged over the polished steel scratches it, and that in turn scratches the next photograph." Now this, let me say, is altogether a mistaken idea. A scratch on the burnisher will not produce a scratch on the thing that is being burnished. The conditions of scratching necessitate something of a gritty nature being left upon, and intimately adhering to, the burnisher. To produce a scratch one or more gritty particles must have been so placed as to be higher than the burnishing surface. This, I opine, is self-evident. A scratch—that is, a furrow—in the burnisher would leave, not a scratch, but a ridge, in the photograph, which would most undoubtedly be flattened by the next transition over the planished surface; for, as I have seen the operation of burnishing performed, the print is passed several times over the burnisher, six or eight times being a fair average. Professional burnishers and burnisheresses—for in Clerkenwell and Birmingham, at anyrate, the fair sex is largely engaged in this department of mechanical art—invariably apply a lubricant to the burnisher, so as to prevent the possibility of scratching. With jewellers, electroplaters, and people of that class, the dregs of beer is said to be in repute as a lubricant; with photographers the best lubricant is said to be an alcoholic solution of soap applied to the pictures by means of a sponge. This prevents any atoms of albumen from leaving the paper and adhering to the burnisher. A scratch on the picture is caused by a particle of hardened something adhering to the polished metal, and a saponaceous lubricant prevents such a "something" getting on to it; the application of a fine stone moistened by a little oil will, however, remove everything attached to the surface of the burnisher.

As Mr. J. Thomson, F.R.G.S., has now completed his great work on China and its people I will endeavour to compress in half-a-dozen lines my impressions arising from a perusal of the work and what has been said of it. Photographers ought to be close observers of the manners and customs of the localities in which they unfasten their cameras; they ought to have capacious notebooks, and jot down everything bearing upon the subjects to which they have pointed their cameras; and, above all, they ought so to photograph and so to write as if those for whom their photographic and thoughtful efforts are made are solely dependent upon them, and none other, for such information as may, in their estimation, be required to enable them to comprehend the entire subject. One cannot go far wrong in writing too fully upon any theme illustrated by a fine photograph; but he may commit grievous sins of omission in this respect. From what has been said about Mr. Thomson's Chinese photographic scenes and incidents I imagine that he has hit the happy medium of giving plenty of pictorial variety, and in describing such pictorial sketches as he has given with quite as much fulness as is required. I grieve to say that I have in my possession several really good negatives, taken by myself, which represent subjects on which I could not say more than half-a-dozen words by way of explanation; but of course I was not, when taking them, travelling from Dan to Beersheba, nor in any inaccessible portions of the earth, and had no idea that anyone would feel a special topographic interest in such pictorial waifs and strays. Circumstances, you know, alter cases.

Another nail has been driven into the coffin of Mr. Hermann Vogel's foolish notion as to the lengthening of the more refrangible spectral rays by affusing the sensitive film by washes of yellow colouring matter. Dr. Monckhoven has sent a paper, read at a late meeting of the London Photographic Society, which proves to demonstration that the *quondam* vaunted theory of Dr. Vogel is an empty whim which cannot be substantiated. There is no immediate hope that the washing of either iodide or bromide of silver with, or encircling them in, yellow pigments will alter the action of light upon them.

Mr. Bovey's observation, in connection with the discovery, invention, or introduction of collodio-chloride, that he has no wish to see justice done to himself at the expense of harmony, leaves matters in a somewhat unsatisfactory state. Mr. Bovey doubtless imagines that if justice were done something would fall to his share which has not yet come his way, because justice has not been done to himself. What, then, has Mr. Bovey done in virtue of which the justice that would of right be due to him has fallen to the share of another claimant? I admire Mr. Bovey's philosophy in considering the suggestion of some new thing—*e.g.*, the collodio-chloride—as "a paltry honour;" but there are *some* persons who will not agree with him.

The "moral" which Mr. Thomas Forrest, of Pontypridd, deduces from his experience of refiners—some of whom gave him a greater sum than others—is scarcely up to the standard of wisdom which one expects from Welshmen. He says, in effect—"Send your wastes to more than one reducer." Now, seeing that the reduction of wastes is but a joke, as it were, which one may perpetrate any evening after work is done, would not all suspicions of unfair dealing on the part of professional reducers be avoided by the simple plan of each person becoming his own reducer, or, at the worst, each person waiting at the establishment of the reducer until his wastes were converted into metal and duly weighed and accounted for? As some London reducers rather court this latter mode of procedure, I am justified in mentioning it as one which is available and also (I add this from personal knowledge) highly satisfactory.

A look at the *Moniteur de la Photographie* comes in my way pretty regularly now, and half unconsciously I have contracted the habit of going over the paragraphs of the mysterious entity who writes its letters from London to see if I could tell from what source he had cribbed his paragraphs. I generally find that he owes a great deal to THE BRITISH JOURNAL OF PHOTOGRAPHY, and am often tickled at the straits he is put to in order to avoid any acknowledgment of the fact. Its name sticks in his pen like corn in the gizzard of a dead goose. He is the same individual—if he be an individual—who identified me, as my friends may remember, with some person called "Jeremiah Dawson." Last week he has been particularly pressed on this head; but he has won the trick. He quotes Mr. M. Carey Lea as if he were an intimate friend of that gentleman's; he enumerates the papers on photography and science that appear regularly, telling Frenchmen that the *News* comes out as regularly as the *Comptes Rendu* of the Paris Academy of Science, or the *Moniteur*, which highly-important fact it may be doubted if they knew before; but anything does as an advertising dodge nowadays. He owes to you the coals-to-Newcastle sort of news (for it was out of that same *Moniteur* that you got it) that Brussels has got a photographic society; but he does not say so, although he quotes almost the entire paragraphs, and also the news about the Amsterdam exhibition. He seems, in fact, a very pretty fellow, and as clever at "appropriations" as some others who have been lately grilled rather hotly. The best of it is, too, nobody seems to know him. Whether he is in the body or out of the body I cannot tell; but he is the best hand at affecting blindness in one eye that I ever came across. Couldn't you unearth the "carl" and let us see what he is like? Did you ever meet him at any photographic society or scientific gathering? *I* never did, and my ramblings are not few.

THE TRUE HISTORY OF THE COLLODIO-CHLORIDE PROCESS.

IT is with some reluctance we return once more to this well-worn subject; but, a request having been received from several correspondents that we should publish the true history of the process, we do so by merely giving an extract from one of our earlier numbers—that of August 16, 1867—in which appeared the following:—

"Before printing in parallel columns the *two* announcements of the discovery of this process, we" (THE BRITISH JOURNAL OF PHOTOGRAPHY) "may observe that M. Gaudin adopted the name 'photogene' to represent the admixture of either the iodide or chloride of silver with collodion:—

"*M. Mc.-A. Gaudin in Photographic News of August* 23, 1861 (p. 403).

'I have prepared two photogenes with collodion—one with iodide, *the other with chloride of silver* as a basis. The photogene with iodide of silver is sometimes as sensitive as a wet collodion plate. It may, therefore, be used for taking negatives upon paper in the camera. The photogene with chloride of silver' *(collodio-chloride)* 'may be used as a substitute for ordinary positive paper for small pictures. Amateurs will find it very convenient for that purpose.' M. Gaudin then explains his method of making the photogene, viz., having in one bottle some collodion in which nitrate of silver has dissolved, and in another some collodion in which chloride of ammonium is dissolved, and then mixing the two together. True, he does not specify exact proportions, leaving that for any formula maker to do who has a table of chemical equivalents at hand to aid him.

"*The Editor of the News in his Almanac for* 1865 (p. 53).

'We have during the past year discovered a process of printing with chloride of silver in collodion which promises to be of considerable value and importance.' He first dissolved some nitrate of silver in collodion, and then added to it the requisite proportion of chloride of sodium previously dissolved in distilled water. He subsequently found that chloride of strontium would answer better than the chloride of sodium, and gave working directions by Mr. Cooper, in which that gentleman treats of the best method of toning and fixing these collodio-chloride prints. His method of preparing the 'photogene' bears a marked resemblance to that generally recommended by M. Gaudin:—Dissolve in one bottle of plain collodion some nitrate of silver; and in a second similar bottle of collodion a certain proportion of chloride of magnesium, 'or an equivalent proportion of any other chloride soluble in alcohol,' and mix the two together.

"By these facts," continues the BRITISH JOURNAL OF PHOTOGRAPHY, "thus placed in juxtaposition, and selected (without intentional cruelty) from the pages of our contemporary himself in preference to any others, it will be apparent that room is afforded for some strong comments. We present them as they stand, and leave our readers to draw their own conclusions, feeling assured that they will think with an eloquent writer of the present day, that 'in the testimony afforded by an array of mute facts there is neither possibility of collusion nor opening for fraud.'"

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

A SPECIAL meeting of this Society was held on Tuesday evening last, the 30th ult., in the Architectural Gallery, for the purpose of passing the new laws, a draft of which had been placed in the hands of each member, Mr. J. Spiller, F.C.S., in the chair. Minutes of a previous meeting having been read and confirmed,

The CHAIRMAN said that the new draft of laws, to the preparation of which the Council had given very careful attention, having been placed in the hands of all the members, it would not be necessary then to read them. He would simply place them before the meeting, and take a vote upon each *seriatim*.

Mr. Jabez Hughes said that as there were only three or four members present besides the Council, it was practically a Council meeting, and the passing of laws was too important a matter to be decided under such circumstances. No post cards had been sent out with the announcement of the meeting. The intimation that such a meeting would be held being only given in the Society's *Journal*, which few people opened, members probably did not know of the meeting. Besides, it was always difficult to get a good meeting together in June. He should propose that the consideration of the laws be postponed.

The Chairman said the meeting had been duly announced. The regular June meeting had been really one of the largest they had ever had, and he himself at that meeting had stated that the members would be shortly called together to consider and pass the laws then nearly ready.

Mr. A. L. Henderson seconded the motion for postponement.

Mr. H. P. Robinson said that he had come expressly from Tunbridge Wells to attend this special meeting for this special purpose, and he did not think that the absence of members who did not feel enough interest in the matter to attend ought to influence the proceedings.

After some conversation as to whether the members had had full opportunity of knowing of the meeting, in which Mr. Dallmeyer, Mr. Dymond, the Chairman, and others took part,

Mr. Hooper, as acting secretary, said that every member had received full intimation of the meeting, which was prominently announced in the journal, which, with a draft of the new rules, was sent to every member. An intimation was given at the last meeting, which was a full one, to the effect that a meeting would shortly be called, and members having any interest in the question would doubtless have looked to their journals and become fully familiar with the fact. But not only was the announcement made in the Society's journal—it was announced in the two weekly journals, one or other of which everybody read. Any statement that members had not full means of knowing of the meeting was trivial and childish.

Mr. Bird said it was certainly to be regretted that a fuller attendance was not present to consider the laws. He could state that the draft had been made carefully, and without any kind of personal bias; but still there were points upon which he should have been glad to have had the opinion of a full meeting. As it was, he thought the simplest plan would be now to pass the laws as a whole, and any point requiring revision could be fully considered at the annual meeting. This would be better, he thought, than leaving the whole question in suspense until that time. He hoped, therefore, Mr. Hughes would withdraw his motion.

Mr. Hughes urged his motion.

Mr. T. S. Davis seconded Mr. Bird's motion. The matter could be fully discussed hereafter, if necessary; but he thought that this need not be expressed in the motion, which should be simply to the effect that the laws be passed as they stood.

Mr. Blanchard thought that the non-attendance of members was in one sense a very high compliment to the Council, and showed that they had full confidence in the laws they had drafted. Feeling that there was no need to discuss them, members simply left them to be passed.

Mr. Hooper took a similar view. Non-attendance showed two things: the members were sick of having their time wasted on merely business considerations in which they had little interest, and had perfect confidence in their Council, to whom they left the matter.

The Chairman then put Mr. Hughes's motion, which was lost, himself, his seconder, and another only voting for it. He (the Chairman) then put the motion that the laws be passed *en masse*.

Mr. Dymond said that the laws were open to verbal improvement. The first law, for instance, was not specific enough. It did not say by whom some vice-president or member of the council should be appointed to preside in the absence of the president. He should move, as an amendment, a verbal alteration, making the matter more definite.

Mr. Hughes said that the rules did not, in many respects, meet the wishes of numerous members of the Society whom he represented. There was no provision for a chairman at all in the absence of all the Council, a thing which happened when, at a recent meeting, all the Council left the room.

The Chairman said that even on that occasion all the Council did not leave the room. But he must ask if Mr. Hughes, in these remarks, intended to second Mr. Dymond's amendment.

Mr. Hughes said no; he simply intended to challenge everything he could.

The Chairman said that as the amendment was not seconded, he would simply put the motion that the laws be passed, which was carried.

Some conversation followed on the question whether the discussion of the laws at the annual meeting was to be made compulsory, or merely left to the motion of any one anxious to raise the question at that time; but no resolution on the subject was passed.

The Chairman announced that as in the new laws the Treasurer was not included in the eighteen members of Council, another vacancy existed, and as Sir Charles Wheatstone was next on the ballot, he announced him as the new member of Council.

The Chairman then stated that an exhibition would be held as usual, the time and place of which would be duly published.

The Chairman next announced that Mr. Richard Friswell, F.C.S., had been elected by the Council as secretary and editor. He added that the Society were much indebted to Mr. Hooper for his able services in the interregnum. The Council had already passed a vote of thanks to him, and he now asked the meeting to do the same.

This was done by acclamation, and the proceedings terminated.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of the Council of this Society was held on the 27th ult., at 12, York Place, Portman Square, the Right Hon. the Earl of Rosse in the chair.

The minutes of the last meeting having been read and confirmed,

The Secretary laid before the meeting the pictures for the current year, and Mr. Glaisher read his report upon them, of which the following is an abstract:—

After a good two days' work in examining and classifying the pictures for this year, the first thing that suggests itself to one's mind is the large proportion of good pictures and the small number of inferior ones. It is no unusual thing to have more pictures worthy of prizes than there are prizes to award; but this year we note no less than sixty-eight which I may call "should-be prize pictures," and which demand our special and careful consideration. This very large number of first-class pictures is almost unprecedented, and shows a healthy vigour in our no longer young Society which cannot but be gratifying to our Royal President and the members of the Council, most of whom have been with us from the beginning. I notice with pleasure that Mr. Hobson, though so good last year, is this year better still, and must now rank as one of our most accomplished photographers. Mr. Beasley and Mr. Murray again compete for the dry-plate prize; but the latter gentleman, though quite equal to last year, is now surpassed by Mr. Beasley, whose works this year take precedence, not only of the dry-plate pictures, but of all the wet-plate ones. Mr. Ravenshaw's Indian views are also perfect gems. Captain Lewis again sends us some very interesting studies of prison life. Colonel Rocke, whose pictures last year were wanting in vigour, now steps into the very foremost rank. Captain Layton, although still perhaps falling short of a prize, sends some views of great artistic merit. From Sir Joscelyn Coghill we have a series of charming Swiss views; whilst Captain White and Major Allen still keep the high position which they have held for some years past. I notice, also, some of our new members whom we may welcome as acquisitions to our society, amongst whom I may mention Mr. G. Brewis, Captain Toke, Mrs. Hancock, and Mr. Milne.

Class 1 contains ninety-four pictures, contributed as follows:—J. H. Ravenshaw, 15; F. Beasley, 13; Sir J. Coghill, 9; Captain White, 8; Major Allen, 6; Colonel Rocke, 6; W. S. Hobson, 5; R. Murray, 4; Captain Lewis, 4; G. Brewis, 4; J. W. Richardson, 3; Rev. W. E. Hancock, 3; Captain Toke, 3; Captain Layton, 2; J. McAndrew, 2; Mrs. Hancock, 2; D. Knapping, 2; W. G. Hunter, 1; T. Brownrigg, 1; and R. O. Milne, 1.

Class 2 contains one hundred and fifty-nine pictures, contributed as follows:—J. H. Ravenshaw, 23; F. Beasley, 16; Rev. W. E. Hancock, 12; Capt. White, 11; Capt. Toke, 10; T. R. Shervington, 7; J. McAndrew, 7; W. S. Hobson, 6; S. G. B. Wollaston, 6; D. Knapping, 5; Captain Layton, 5; Major Allen, 4; N. M. Settna, 4; Colonel Rocke, 4; G. Brewis, 4; K. Roberts, 4; Sir J. Coghill, 3; R. Murray, 3; W. G. Hunter, 3; J. G. Hyde, 3; General Sladen, 3; R. O. Milne, 3; A. Suzanne, 2; J. W. Richardson, 2; Captain Lewis, 2; Mrs. Hancock, 2; S. T. Brownrigg, 1; J. R. Ritchie, 1; and Captain Fox, 1.

Class 3 contains 169 pictures, contributed as follows:—J. H. Ravenshaw, 15; T. R. Shervington, 12; Rev. W. E. Hancock, 12; S. G. B. Wollaston, 11; F. Beasley, 10; J. H. Ritchie, 9; Capt. White, 8; Capt. Layton, 7; Mrs. Hancock, 6; J. C. Stenning, 5; J. W. Watling, 5; J. McAndrew, 5; R. Murray, 5; Rev. T. F. Ravenshaw, 4; A. Suzanne, 4; J. G. Hyde, 4; E. Milsom, 4; General Sladen, 4; D. Knapping, 4; Capt. Toke, 4; Sir J. Coghill, 3; Capt. Fox, 3; K. Roberts, 3; R. O. Milne, 3; J. W. Richardson, 3; N. M. Settna, 2; Col. Rocke, 2; Mrs. Fox, 2; G. Brewis, 2; Capt. Lewis, 2; W. G. Hunter, 1; T. Brownrigg, 1; W. S. Hobson, 1; G. W. D. Green, 1; Mrs. Welbourne, 1; Rev. H. Palmer, 1.

The remainder of the pictures are comprised in classes 4, 5, and 6.

The following prizes were then awarded:—

First prize, F. Beasley, Esq., for Nos. 36, 14, and 24—a large silver goblet. J. H. Ravenshaw, Esq., for Nos. 251, 261, and 265—a silver goblet. W. S. Hobson, Esq., for Nos. 103 and 105—a silver-mounted claret jug.

Colonel Rocke, for Nos. 32 and 34—an oil painting in gilt frame. Sir J. Coghill, for Nos. 11 and 14—a large album handsomely bound in morocco.

Captain White, for Nos. 57 and 77—a graphoscope. Major Allen, for Nos. 144 and 148—an oil painting in gilt frame. D. Knapping, Esq., for Nos. 12 and 14—a large album handsomely bound in morocco.

J. McAndrew, Esq., for Nos. 25 and 28—a graphoscope. T. Brownrigg, Esq., for No. 4—an oil painting in gilt frame. G. Brewis, Esq., for No. 126—a large album handsomely bound in morocco. Captain Lewis, for No. 52—an album handsomely bound in morocco. R. O.

Milne, Esq., for No. 2—an album handsomely bound in morocco. Capt. Toke, for No. 10—an album handsomely bound in morocco. R. Murray, Esq., for Nos. 81 and 82—an oil painting in gilt frame.

Certificates of honourable mention were awarded to W. G. Hunter, Captain Layton, J. W. Richardson, Rev. W. E. Hancock, and Mrs. Hancock.

A. J. Melhuish, *Hon. Sec.*

THE "WET" SELF-DEVELOPMENT CLUB.

This singular "Wet" Club recently assembled in the Owl Gallery, Canonbury Tower. The room is a long, high-roofed, dingy, weather-worn apartment, lighted with one or two rusty gas jets along the bare, dilapidated walls, and which served to do little more than reveal the darkness. Black rafters overhead, the haunt of owls and bats, tended to increase the portentous half-gruesome, mouldy aspect of the place, which was, in truth, only clearly lighted at the chairman's end. Conspicuous behind his seat hung an immense imitation parchment covered with dog latin, and to which was appended some amazing signatures and seals. This document was placed in a vulgar frame, tawdrily ornamented with clotches of putty and German lacquer, and set forth that the distinguished scientific appropriator who honoured the Club by his presidency was Master of Arts in a certain American university which devoted itself to the laudable object of getting rich by degrees. This striking sheet had three gas jets of the largest bat-wing size blazing in front of it, and shone forth the one glorious object amid the gloom. Sundry queer-looking cupboards broke the uniformity of the dead grey inner wall, and in one of these was the library. Curiosity prompted our reporter to inspect the collection of books, and it so impressed him that he jotted down the following amongst other strange, and even unique, literary productions:—*The Slang Dictionary; The Literary Dauber's Vade Mecum; Shaksperean Fritters for Shallow Wits; Common Literary Quotations, chiefly Shaksperean, by the Chairman; The Art of Dressing Foul Language, by Adepts; Quiet Thoughts on Quacks; Cash University Calendar and Degree Price List; The Puffer's Book of Words; Cyclopædia of Puffery, by Members of the Club; How to Blow Your Own Trumpet, by "An Old Photographer;" May Day, a Mechanical Work of Art, by an Aper; The Gullibility of Man and Cheap Degrees, by "M.A.;" A Treatise on the Art of Vilification, by "Fairplay;" The Constituent Elements of Mud, by a Genuine Lark*, &c., &c. The list might be greatly increased, but this may, perhaps, be enough to show the character of the Club and the members' reading. Another cupboard was devoted to the archives of the Club, but beyond some unused photographic apparatus on the top shelf, nothing was visible save the wrecks of conviviality.

On the night in question there were seventeen members present—the number is limited to that of the letters of the alphabet; and it was evident from the solemn looks of the strange, motley company that business of importance was on hand. After the formal preliminaries had been gone through of unlocking the cupboard and bringing from thence and from a recess in the wall a plentiful supply of liquors, the Chairman tapped on the table, ordered glasses to be filled, and said that with their permission he would then proceed to business. There was a shuffling, some murmurs of assent, and a few satisfied grunts as the warming draughts went down, and then the Chief of the Club rose slowly on his hassock.

He was a remarkable-looking man in some respects—of small stature, large head, and of Falstaffian or rather *barrel* shape, for he stood to that hero, as regards size, as a quarter cask of beer stands to a tun of sack. But what struck the spectator who saw him for the first time most was the singular aspect he had of living, as it were, *behind* his face. The outer countenance of the man looked more like a mask than any face ever seen. Stolid and heavy, it might have been that of a mere vegetating being who had no thought beyond his hunger, only that there was somehow an air of power of a certain kind about the personality, and, as we have said, a close look led one to think of him as one who only used his outer man as a robber uses his cave—to hide in. Occasionally gleams passed over the passive, heavy features; but they were not like the play of a lively intelligence roused to join in the feast of reason, but rather gave the idea of a man coming with a light to the window of a watch-tower to look abroad. The inner man was not at such times revealed to you; you only saw that he existed, and that he was observing you.

This remarkable personage presently began to speak, and as he spoke he waxed gradually warm until the light shone and darted out of his eyes from face to face; but all through the features were stolid and passionless as an image of Confucius. The speech was in some respects a peculiar one, opening up a new region of casuistry; but it is too long to give *verbatim* here, so we only extract leading points.

The orator began his speech by saying that the present time was a crisis in the history of the Club. It had had rough rubs in the past, but these its united assurance had triumphantly weathered; for even when beaten it had toughly kept the field until the victors gave up the game. And now, when things had been settling down to a quiet jog-trot, and everybody looked to enjoying the hard-earned honours, sundry envious fellows of the baser sort—mere spume—had again started up to impugn the whole established order.

"Fellow Self-Developers," said the speaker, raising his hand impressively—a gesture many imitated, using the opportunity to empty anew their glasses—"they do not attack us all. They know better. It is *me (sic)* they belabour, and *my* reputation they have wellnigh murdered. But, though that be so, consider whether it does not affect us all. Do you not stand or fall with me?"

"Not yit, be jabers! I've not had enough whishkey!" put in an Irishman at the foot of the table, by name Murtagh O'Flamm.

"Silence, sirrah!" roared a truculent, heavy-browed man, "and attend to the chair." Whereat Tuffy, as he was familiarly called, subsided.

"Do you not stand or fall with me?" repeated the speaker. "Have I not laboured to build up the reputations of all? What would they have been had mine not been supreme? Of what use would it be for cattle like my traducers to praise you? Faugh! Where are *their* honours? Of what noble university are they graduates? What great step in scientific progress is labelled with *their* names? Where is the good of knowing fellows like those? Could they give you fame? Have their names weight in other lands for a moment to be compared to mine? I say, No! And for your sakes I suffer. That I might lift you up I begged and bought honours! Yes! I scrupled not to borrow. And have I not lifted you up therewith? Who is there here who does not owe half what he has to what I have done or let him do? Those of you who can write have I not suffered to praise yourselves without stint under my far-spreading ægis? And have I not had my reward, brethren? (Hear, hear—ironically, in a foreign accent.) Some of you may at times have sought to contemn me, but what's the use? Can we do without each other? I say, No! for if *I* am proved to be all those *canaille* say, what of *you?* You rest on me, my friends, and we must uphold each other."

The orator then went into many details as to the manner in which "they" were traducing him; but the reporter could not follow his reasoning clearly. It appears that he had once crept into somebody else's shoes or clothes, and presuming on public ignorance had ventured abroad only to be discovered; and this had always on every occasion been flung in his teeth. It appeared, too, that here—in this act of adoption—was the chief peg on which all the honours of himself and colleagues hung, and therefore, if taken away, the whole were in danger of being trampled in the gutter. Accordingly the reasoning of the speaker was that at all costs this past deed of his must be upheld. For their honour's sake they must maintain that the shoes or clothes were his own, or, to use his words, that the "peculiar salt he had substituted in a chemical compound" had really been evolved out of the depths of his own inner consciousness. "Whatever has been said—nay, whatever has been even proved—it is always possible to maintain the contrary, and we must maintain it," he said, with much more of the same kind.

The speech met with cordial approval, and when the orator concluded and sat down it became clear that the warmth of his oratory had produced a very great thirst. There was a filling and emptying of glasses marvellous to see, and as the Chairman grew moist again after his exertions he showed symptoms of growing less defiant, even descending towards the lachrymose. So strong did his despondency grow that he mounted his hassock once more to express it. You would have said that his voice was husky with emotion only that it rolls along so deeply that no lump in the throat could ever make it grow chokey. He appealed to his backers whether there was anything so preposterous, inflated, or bombastic in the pretension he set up that he should be made an object of public ridicule, and branded as a charlatan. Why should he set the table in a roar, eh?—that is, why should tables be set in a roar at him? It was uncalled for and unfair; he had only done his duty and benefited his Club on the usual understanding. "My friends," he said, "I have wept when I found myself made a laughing-stock of, with every puppy crying at my heels. After I had succeeded, too, in placing my name among the Talbots and Daguerres of the art by my own unaided pen, it was too cutting. I—I——pass me the bottle, my dear sir, I cannot get over it. I had set my heart on being an inventor—ever such a little one—and, ge-gentlemen, they have taken that joy from me! Yet did I not invent this? Who saw the thing before I found it, buried in the unread depths of our dearly-beloved organ? Not one! Did it ever come up at a photographic society meeting? Never! But I know that envy is the cause of it. Our organ is *printed* in London, and the rival one—that cursed *Liverpool* Journal, the mouthpiece of the country Garges—although bigger than ours, is *not* printed here. Is not that enough? I am sure you need no more words from me. I feel overcome"——and here the poor gentleman fairly boo-hooed, and sunk exhausted into the chair.

There were a few minutes of stunned silence—the wet blanket had fallen heavily, and it took no little struggling to get from under it; but, after a time, a desultory discussion started up, and numerous suggestions were thrown out which, however ingenious, failed somehow to open a clear way out of the trouble.

"Be St. Pathrick, now! if it were only thrue that the blaggards were lyin' 'twould be the aisiest thing in the world," remarked O'Flamm, with maudlin candour.

"True! Who cares for truth," jerked a hard, dry voice, apparently from inside a sack; but, as the speaker turned his head, it became evident that there was an opening for the face in the cloth, and that face looked so twisted and queer that at once Browning's "dissenter" rose to the mind—

"A yellow man, like the penitent thief,
With his jaw bound up in a handkerchief."

His sharp remark met with a cordial "hear, hear," and Tuffy was for the moment silenced. Yet the "truth" which the *canaille* said they had on their side had made an awkward hitch, and the Chairman appeared to lose heart as he contemplated it. The worst of it was that he had himself involuntarily given the evidence against his own assertion. The ignorance which everybody might have been in had he quietly kept his "find" out of sight, hid in a foreign tongue, till the time came to play the card and win, had been imprudently dispelled by his own act, and it was even confessed at the meeting that but for the labours of his translator he himself would have remained in ignorance that a gem so rare lay unowned. Nothwithstanding the academic honours with which, in his person, the Club is sustained, it was confidentially whispered at the lower end of the table that ignorance would here have hid it from the borrower as much at least as from his contemners.

What was to be done? Nobody seemed to know, till at last a heavy, sponge-faced, Dutch-boor-looking man got up, and, elevating his half-empty tumbler, declared that, whatever others did, he meant to stick to the old ship. "Let us swear them down" was his advice, and under its stimulus spirits revived. Schemes were entered into. The learning of the whole company was called forth to concoct abusive language, and suggestions, drafts, epithets, scraps of natural history, rags of mental garniture of every kind and savour were poured in on the Chairman, who, melancholy still, and least assured of all, could not but undertake to put them in shape, and embellish them with proper Shaksperean quotations.

"'Villipend's' the word, my boys!" roared the Dutch-looking lubber; "and if we do not properly tar and feather the rascals, my name's not 'Coovey,' only whatever you do keep 'Dogberry' out of it."

"Och, my boys! but you'll put butther in the tar, won't you?" said Tuffy, and he laughed in irony.

The proceedings having now reached a happy state of harmony and considerable spirituous elevation, it was felt that there was no longer any occasion to maintain the star-chamber attitude. There was a grand sense of moral freedom coming over the minds present which was in want of a vent. Every man felt more regardless of the world than his neighbour, and "who cares for truth?" was the motto of everyone now that action was decided upon.

Under these circumstances it is hardly to be wondered at that the Chairman should presently be greeted with loud calls for a song.

"Who's to sing?" inquired he.

"Why, yoursilf, to be shure," said O'Flamm; and for once the meeting was with him. There was a general cheer of assent, and some seized their glasses to give their sentiments effect by rapping on the table, whereby a few were broken, and much good liquor was spilt. For a time the venerable chief coyly resisted the proposition, bnt at last he yielded, and once more stood on his feet. Sundry preliminary preparations had been gone through, and he was just about to start, when again O'Flamm's voice intruded—

"Shure, thin, yer riverence, but if ye stand so far off the divil a wan os'll feel that yer there."

"Hush!" said his neighbour, "don't call him little; he doesn't like it."

"Bedad, an didn't I say 'feel,' ye spalpeen! just to keep *his* feelins aisy?" answered Tuffy, loud enough to be heard all over the room. But the grin this produced was lost in the general chorus of cries calling on the Chairman to mount the table, and his elevated soul marked nothing of this byplay. To this also he yielded, and, half climbing, half hoisted, took his place in the middle on a space cleared of bottles and pipe furniture for his accommodation.

Once there, the potentate of the Club smiled, put one foot forward, hemmed, and made a graceful bow, laying one hand on his bosom. Then, rolling his eyes aloft for a moment, he drew a long breath, and in the most lugubrious of basses began—

AIR—*The Hermit Crab*

"'Twill be ten years to-morrow
Since I, to my sorrow,
Set up for a leader of men;
And I deeply lament it
That ever I went it,
But hope I shan't do it again, again,
I hope I shan't ——"

At this stage a florid-faced, red-haired German—with eyes always wide open in a supercilious stare, so that his eyebrows looked as if they would some day fly over the crown of his head—known as Herr Professor Schakal, who had sat most of the evening stolidly drinking and smoking, and who had fidgeted all through the stanza, started up and, like Hans Breitmann when he heard that the foe held the ford between him and his plunder—

"He uttered no hymn and no psalm,
But he opened his mouth and he briefly said 'tamm;'"

and, as he said so, he waved his right hand, wherein was a cigar like a cabbage stem, thereby depositing about an inch and a-half of hot ash right on the top of a bald-pated *claqueur's* head who sat second below him, and next to O'Flamm. The humble personage thus hit, and who was accredited as foreign puffer of the members of the Club at a cheap figure, started in alarm, muttered "Oh me! oh my!" half-a-dozen times, and taking a snuffy handkerchief from his pocket began wiping off the dust, and to polish the scorched place with much assiduity.

Seeing this O'Flamm patted him familiarly on the back, and, with a knowing wink, said—

"Brunt, eh? There's nothing like whishkey for a burn. Hate or cowld is all alike to the crathur. If ye keep it from wather it will cure anything," and with that he lifted his glass half-full of the "crathur" neat and emptied it on the man's head, telling him to "rub now like the divil."

The man's eyes were full of it before he knew what had been done, and he fairly shrieked—"Oh, my goodness me!" till the very roof rang again, vainly seeking to rub the liquor out. He only made matters worse by rubbing the snuff in, and at last subsided into a condition of chronic tearfulness and inarticulate moaning—"the subsequent proceedings interested him no more." Meanwhile the German had followed up his forcible monosyllable with a speech intimating that he liked not the song. "Hoch!" he shouted; "Der Himmel hängt voller Geigen!* Vat you sing, melancholy fréin? Ve must einen frölichen Gesang haben, Verdammtes Geweine! Sing joli, vat you call 'a merry song.'" And the meeting appeared of his mind.

O'Flamm roared "hear, hear!" He with the jaw in the clout jingled his glass with a spoon and declared that the idea of self-depreciation gave him sea-sickness. In short, it was the mind of the meeting to have mirth.

The Chairman being elevated, though stolid, was accommodating, and smirking assent he cocked his head on one side, winked, and with a leer started anew in lustier measure—

"Methinks it seems but yesterday
Since we were drunk togeth— "

"Ach Gott! Hen Je! Potytausand! Nein, nein! Trunk! es gibt mir nicht!" and Schakal looked like fighting as he emerged from his cloud and waved his cigar stump again defiantly. Several members growled at his contumaciousness; but, as he was an old and close friend of the Chairman's, nobody dared say much. Besides, allusions to drunkenness at that hour *were*, on the whole, out of place. Yet the Chairman, self-satisfied as he was, could hardly feel other than hurt at this new interference, and was about to descend from the table sulkily when Schakal reminded him in better English than he used when excited (or else he would not have been understood) that the Chairman had been busy writing a new song that very afternoon when he (Schakal) called on him. So then there arose from all sides calls for "The new song!" "The new song!" "Who's like our chief for a song?" "Hurrah for the new song!" until the Chairman was clean carried away, and allowed so much of himself to become visible through the outer mask as enabled one to see that, within, the depths of vanity might be unfathomable. His great lamentation was that his glorious bass had remained untutored—he should have been a singer; and nothing delights a man so much as to praise him in the line he thinks should have marked his vocation. But to be supposed able to *write* as well as sing!—the thing was perfect bliss!

With a lightness wonderful for his shape and years he turned again and bounded on the middle of the table, ending with a pirouette that brought a burst of applause. That done, he forthwith struck into his song, which, though meant to be exceedingly lively, had yet somehow an undertone of sadness in it—

AIR—*My Head is as Light as a Feather.*

Oh! I am a deucéd smart fellow,
However the bumpkins may bellow;
It's envy that makes them so yellow,
'Cause they see me at the top.
Once I was at the top,
Twice I was at the top,
Thrice I'll be at the top,
If you'll only hold me up!

They've only got facts to sustain them,
So we can afford to disdain them,
For always with spume we can stain them—
If you keep me at the top!
Who but me at the top?
I'm the man for the top!
For there I mean to stop,
If you'll only hold me up.

I never lov'd facts in my life, boys;
They are always productive of strife, boys;
So now it is war to the knife, boys,
That I may stay at the top!
Nowhere but at the top!
Sweet's the seat at the top!
Here's to me at the top.
With the plumes I'll ne'er let drop!

For imagination shall win, boys!
Romancing was never a sin, boys!
Who'd stick at making a spin, boys,
To keep me still at the top?
Ho! to be at the top!
Hi! to keep at the top!
I'll hold on at the top
Till the rogues do tire and drop!

* Literally, "The sky hangs full of fiddles;" meaning, in common speech, "The luck is with us."

Then won't we sing a rare song, boys,
To prove that success can't be wrong, boys,
And that everything's right to the strong, boys?
Won't my *voice* be at the top?
Once I was at the top!
Twice I was at the top!
Thrice I'll be at the top,
If you'll only hold me up!

"Chorus again, boys; and so here's"--(hic!)—

Once so merrily hop!
Twice so merrily hop!
Thrice so merrily hop!
With a-ho-a-ho-a-hop!

At the conclusion of this song the enthusiasm of the company was raised to the highest pitch, and at the unexpected turn of the concluding chorus all had started to their feet and begun to hop about like satyrs let loose. The dumpy, bibulous Chairman had himself set the example by leading off as he began the "repeat," and he continued to spin so fast after the song was over that it was no matter of surprise to find him suddenly come to an ignominious squash on the floor. There was a rush and an outcry as members heard or saw the fall, and O'Flamm, first up, raised the fallen leader.

"Och, be St. Pathrick! murther an' arson!" he roared; "I do belave his honour's rivirence has broke his leg! No! What, thin, me darlint—all a-jumbled of his inside? Take a dhrap o' the crathur. Oh dear! Oh dear!" and Tuffy began to weep—not, as it appeared, from sorrow so much as from a wish to seize a convenient opportunity of getting rid of the superfluous moisture for some time visible in his eyes.

By his help the Chairman had got on his legs again, and, rubbing his elbow, with some rueful remark about the "funny bone" he betook himself without further ceremony towards the peg where his hat hung. It was the signal to disperse; and, after one more pledge round to stand to each other at all costs, the seventeen quickly vanished in the night. Cramped, weary, and thirsty, half-choked with dust and tobacco fume, the reporter crept from his perch and made for the table, only to find the bottles all empty. A bottle that he had seen half full of "Dunville's" a moment before the Chairman fell was nowhere to be found, and he, perhaps wrongly, surmised that that elevated individual had accidentally carried it off in his pocket.

Correspondence.

PHOTOGRAPHIC EXHIBITION IN THE PALAIS DE L'INDUSTRIE.—LAMBERTYPY.—CADMIUM-SALTED COLLODION.—NEÔLEO-PEINTURE.—COLOURED CARBON ENAMELS.—BLEACHING IVORY.

THE exhibition of the Photographic Society of France now open in Paris, at the Palais de l'Industrie, is said to be so exceptionally-fine a one that every exhibitor deserves a medal. As it is, the jury appointed to make the awards have decreed forty-five medals and twenty honourable mentions, whilst there are only eighty-six exhibitors! I hope in my next letter to be able to publish a list of the successful candidates. M. Rousselon is one of them for his process of photo-engraving. At the last meeting of the above Society Weston's rotary burnisher was exhibited, and excited the attention of members.

M. Lambert's process of enlargement and retouching has received at the hands of M. Berthand, President of the *Chambre Syndicale de la Photographie* the highest commendation. Having been present at a demonstration of the process, this gentleman was so delighted with the simplicity of the method and the beauty of the results that he has taken out a licence himself, and conceives it to be his duty to advise all his brother professionals to do the same. Perhaps I may be permitted also to mention that M. Berthand has written to me a letter in terms of praise of the "*Collodion Rapide et Inalterable*" made in France according to my published formula in the *Moniteur*, with the salts of cadmium only. It is satisfactory to find this formula approved by one of the leading Paris professional portraitists, because in England it is customary to use an iodiser containing ammonium iodide, and to send it out in a separate bottle. All that is needed for the exclusive use of the cadmium salts in collodion is a really good pyroxyline, and then the iodised collodion will keep indefinitely and always give good results. Some which I made last June yields quite as sensitive a film as my most recent sample made only a few weeks ago.

Neôleo-peinture is now receiving much attention in France, where no one has as yet come forward to dispute its novelty. Although its inventor is clearly M. Duppa, who patented the process in England twenty years ago, and although one of our Editors assures us that he has had the happiness of knowing several female artists who have employed it for colouring photographs for many years past, yet this very process has just been patented in "*France et Etranger, S.G.D.G.*" (*sans garantie du Gouvernment*)!

Under the heading "*Nouveauté Artistique*" M. Puttemans has just published a circular containing extracts from the *Bulletin*, the *Moniteur*, and the *Grand Dictionnaire Scientifique du 19me Siècle*, in which the process is highly praised and recommended, and its extreme simplicity pointed out. Even the cautious M. Carette speaks of it in the following terms:—

"Until now I have been unwilling personally to recommend any of the different processes which have been offered to photographers; but in presence of such results as have been shown to me by M. Puttemans I do not hesitate to advise my clients to purchase this process. I have seen it employed, and have practised it myself. Its simplicity is surprising, and its results are truly charming."

The circular concludes by warning the brotherhood against unscrupulous persons who are already seeking to establish a counterfeit method.

The *Dictionnaire Scientifique* says of it:—

"The inventor enunciates first of all the principle that every photographer should be a colourist. His discovery gives, in fact, to these estimable artists the power of transforming every photographic proof into an oil painting upon canvas without its being necessary for them to serve the least apprenticeship. The process offers no practical difficulty, and with a little taste and intelligence one may by a single demonstration acquire the *tour de main* which renders one a skilful manipulator, by the employment of colours prepared *ad hoc*. The results are truly marvellous, and perfection seems to have been attained. Neôleo-peinture, by its rapidity of execution and its adaptability by everyone, is evidently called to fill that gap of photography in the natural colours which science seems unable to bridge over. The latest exhibited specimens leave no doubt whatever on this point."

By a natural transition we pass from neôleo-peinture to coloured carbon enamels, which are produced on the same principle, and I am in hopes, from the remarks of M. Lacan on this latest novelty in portraiture, that it will speedily become popular in France. Referring to my article in the *Moniteur* of June 15, in which the process is minutely described, the editor says:—

"We particularly recommend to our readers the new style of portrait which M. Thomas Sutton describes in his *Etudes Theoriques et Pratiques*. Those who already practice *neôleo-peinture* will find there a means of still further simplifying the operations, and of offering to their clients coloured enamels as well as oil paintings upon canvas. In neither case does the photographic proof sustain any modification, since the colour is applied to the *back* of the image and the likeness remains intact."

These two methods of colouring are those to which I referred, in the early part of this year, in a letter to this Journal, as likely to prove very remunerative to the profession. No doubt we shall continue to hear more about them in France, and I promise to keep my readers posted as to what is doing there in this direction.

This new style of portrait, which I described at page 206, and called the "coloured carbon enamel," will admit of an infinite variety of beautiful ornamentation in the mode of mounting and getting up, and it is here that I fully expect the French will exhibit that good taste for which they have become so justly celebrated. It is hardly possible to doubt that this new style will one day be very popular, and those who first take it up ought to reap a rich harvest of profit. And here I would refer the reader to an editorial article in this Journal, at page 251, in which the method of printing in carbon upon glass is very well and graphically described—much better than I have done it in my article at page 206, although the operations are the same, except that in my article *transparent* glass is used, and in the other article *opal* glass.

Those who take portraits upon opal glass will do well, I think, to give it up in favour of the new method, for there is an infinite charm in colour tastefully applied, and the public are quite willing to pay for it. The production of a coloured carbon enamel is so extremely simple as to be within reach of the humblest professional; but to succeed in the method artistically will, no doubt, require a refined and cultivated taste. Nothing will then surpass the beauty of the result, and the likeness will not be affected in the least by the pencil of the colourist, since no details are hid. The negative may be retouched to any extent, and the printing process is the most rapid and the simplest that has ever been devised. There is no toning, trimming, mounting, rolling, or burnishing. The proofs are as permanent as vitrified enamels, and in colour even more perfect and beautiful. The process is not only suitable for portraits but also for views, more particularly of architecture and interiors. To a good professional colourist it offers no difficulty whatever, and he might easily colour a sufficient number of these enamels per day to become a rich man in a very few years.

Do not think lightly of what I am now telling you, dear reader, for it is the best thing I have ever told you as yet, and I may never have the good fortune to be able to tell you of anything half as good again. Do not smile at the simplicity of the process, for every good way of doing a thing is simple; and do not be dismayed by its novelty, for there must be novelty—our art cannot possibly stand still. Lastly: do not trouble your head about who discovered it; let it suffice that it has been given to you freely. Use it, and turn it to your own profitable account.

M. Cloëz has discovered a simple method of bleaching articles made of bone or ivory. It consists in immersing them in oil of turpentine, and exposing them to sunshine for a few days. They must be suspended in the liquid so as not to touch the bottom of the vessel.

June 26, 1874. THOMAS SUTTON, B.A.

STAINING FILMS, &c.

To the EDITORS.

GENTLEMEN,—Mr. Stillman writes, at page 292 of your Journal, that aurine, when used for staining an emulsion film, causes drying marks of a most disagreeable character.

I prepared some plates in the spring with an emulsion stained with dragon's-blood resin; and though from a single experiment I believe that there was no loss of sensitiveness when one-half to a grain was added to the ounce, still drying-marks appeared on every plate. The films were opaque, and dried with a matt surface, so that the marks could not be seen until after development, when they appeared in the form of narrow, semicircular, wavy bands, less dense than the rest of the negative. The emulsion was a washed one, and the plates were reared up to dry as soon as coated.

It is probable that Colonel Wortley's plan, published to-day, would answer well, provided the emulsion did not extract the stain from the substratum, and thus become, after coating a few plates, practically a *stained emulsion*.

I believe that my method, published in your Journal some time ago, of using stained transfer-paper for backing plates, is about as good a method as any, even if the paper do require moistening for half-a-minute or so with a wet sponge. All dust is avoided; as also are muddy sponges. I find it unnecessary to float the paper on hot water; cold answers better, as the gelatine does not then adhere so strongly to the plate. The paper, being very tough and thick, can be easily moved about on the back of the plate into the desired position.

Mr. Sutton writes, at page 284, that albumenate of silver is instantly blackened by the alkaline developer. If this be the case there is sufficient reason why the albumenate of silver contained in the glass, and mentioned in the same page, should blacken on contact with the alkaline developer. But, then, how does Mr. M. Carey Lea get clean plates with his emulsion?

I should much like to know what reaction, if any, takes place when albumenate of silver is dissolved in ammonic hydrate.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester, June 26, 1874.

PRINTING PRESSES.

To the EDITORS.

GENTLEMEN,—As the Albertype process is free and open to anyone, I should think that the little type printing press offered in your outer columns is the very thing that has long been needed, in order that a very simple and valuable block-printing method may be brought into use.

When the photogalvanographic process was before the public, some few years back, its principal cause of failure was in the projectors looking up too lofty, all their aim being for *high* art. Had they began at a lower point and worked away upon common everyday subjects of commercial use, where a small flaw or a speck or so here or there would have been of little moment, the process would with practice have gradually improved, and probably would have been at the present time in full and profitable operation.

The little press seems to offer an opening to working photographers in the printing of small illustrations, in conjunction with letter-press—subjects that would be of commercial use; and, if produced at moderate cost, would come into great demand and have a ready sale. Literary and antiquarian societies might also find the press useful for printing short illustrated papers on archæological subjects, &c., for distribution among members, or in exchange with other scientific bodies.

If any of your numerous readers have tried the photo. block-printing, some short notice on the subject would prove of great interest.—I am, yours, &c., SUGGESTOR.

June 29, 1874.

ANSWERS TO CORRESPONDENTS.

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

P. T.—Give the prints a far more thorough washing than you have been accustomed to give.

TOWLER.—Your "musings on glass paper" are very amusing. Thanks.

R. BRIDGART.—In our own practice we use No. 2; but any of the others are quite as good for copying.

J. G. FULLER.—We congratulate you upon even an improvement of your sight, and hope the restoration will eventually and speedily be complete.

ONE IN A FOG.—Our experience has mainly been with the glycerine *minus* the honey. Please to send us an ounce or two of the solution by which you have obtained such bad results.

X. X.—Put yourself under a competent tutor and obtain a few lessons in composition. You may obtain the address of such tutors on applying at the establishment of any respectable artists' colourman.

J. R. (Crewe).—The best method of reproducing engineers' tracings is by Willis's aniline process, because the prints are obtained in a permanent pigment at one operation, without the intervention of a negative.

A JUSTICE OF THE PEACE (Leeds).—Try filtering the collodion. Should this not prove a remedy for the defect, then try the effect of mixing the two samples you have been using. They are evidently made from two wholly different kinds of pyroxyline.

G. B. (Wellington, New Zealand).—1. The only suggestion we can make is that you should subject the paper, after being sensitised and dried, to a thorough fuming with ammonia.—2. From the description given in our last ALMANAC, any intelligent mechanic in your locality will be able to construct a baby-shutter.

OLD READER.—We cannot undertake to give you a lesson in the production of transparencies for the lantern. Surely sufficient has been published in both the almanacs and journals to have enabled one who styles himself an "old" reader to know both the principles and the practice involved in their production.

M. P. S.—When photographing in a private room, one side of the sitter will be so much more strongly illuminated than the other as to render necessary the use of a reflector. A clothes-screen, with a white sheet thrown over it, will make a good reflector for this purpose; or a large mirror may be employed with excellent effect.

NEMO.—The colour is due, not to the bath or the developer, but to the preservative. Tannin invariably gives a warm tone; but by the modifications to which the developer is subjected, so is the tone modified. Of the two organic acids—citric and acetic—which are usually employed to restrain the energy of the pyrogallic, the warmer tone is produced by acetic acid.

D. B.—1. Try one or both of the following remedies:—Add a little alcohol to the sensitising bath; or keep the paper in a damp place for a short time previous to floating.—2. We have heard numerous complaints at various times respecting the alleged influence of an albuminous substratum in producing spots on the film, but we are not yet in a position to offer any reliable hypothesis relative to the cause.

E. J. B.—A pair of single lenses will produce distortion; but the distortion will entirely disappear when the picture is examined in the stereoscope, because the distortion of the eyepiece is of an opposite character to that caused by the lens, and hence is neutralised. Try the experiment of examining with a lens of five inches focus two straight parallel lines separated from each other by the width of four inches.

H. N. WALDEGRAVE.—It is necessary to apply a coating of plain collodion to the reproduced negative previous to making the attempt to remove it from the glass. As you observe, negatives of this kind are just what are required, as respects reversal, for the single transfer carbon process.

J. H. T. ELLERBECK (Liverpool).—Referring to an article which recently appeared on *Improving Imperfect Negatives*, our correspondent says:—"I cannot refrain from suggesting a method I placed before our Association some months back for this purpose. I suppose you have got at some details even in the shadows; for if all is blank there you cannot make a picture. My plan is to make a weak transparency on thin glass, transparent paper, or talc, and use this as a mask to the original negative. By this means you get the details of a dense portion as soon as the thinner parts are printed; and if, when this is done, sufficient definition in the shadows is not obtained, removing the mask and printing direct will sometimes heighten the effect. I enclose a couple of pictures—one direct, the other masked. They show for themselves."——The illustrations forwarded are highly satisfactory.

RECEIVED.—M. Carey Lea; E. Dunmore; J. W. Gough; several notices of "exchanges." In our next.

PHOTOGRAPHS REGISTERED.—

Each Picture sent for registration must be accompanied by fifteen stamps t defray the necessary registration fees.

Mrs. M. Linney, Ackworth.—*Two Views of Friends' School, Ackworth.*

James Cooper, Darlington.—*Four Views of Northallerton new Town Hall.*

A. E. Lesage, Dublin.—*Nine Portraits of the Most Rev. Dr. Power, Bishop of Waterford.*

E. Wormald, Leeds.—*One View of Exeter Cathedral, Two Views of Salisbury Cathedral, and Three Views of Stonehenge.*

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

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 740. Vol. XXI.—JULY 10, 1874.

ON SOME RECENT PHYSICAL RESEARCHES BEARING ON PHOTOGRAPHY.

M. G. Hirn has been experimenting upon the optical properties of flame, and theorising upon the incandescent bodies of the sun's atmosphere. (*Ann. Chim. Phys.*, xxx., p. 319.) In considering these researches we must remind the reader of Davy's theory of the luminosity of flame. It is that if any solid substance be ignited to a sufficiently high point—let us say 1,000° F.—it becomes luminous, whilst gaseous matter requires a much higher temperature. But if solid particles be introduced into a gas at a high temperature they instantly begin to throw off light in all directions, and as the temperature of the particles rises so does the colour vary through all the gradations of the colours of the spectrum. Thus, commencing with a red heat, it passes through yellow and what is termed a white heat, whilst a very intense heat produces violet rays. Such is Davy's theory, which, to a certain extent, is accepted at the present day. It has, however, been qualified by the researches of Dr. Frankland, who was the first to point out that we can have highly-luminous flames which do not, or would not, probably, contain solid particles. As examples, let us take the pretty familiar experiments of the combustion of phosphorus or bisulphide of carbon in oxygen. Most of our readers who have attended a course of lectures upon chemistry will remember the dazzling light given off in these experiments. So rich are the lights obtained in this manner in actinism they have been used very successfully in taking instantaneous photographs.

The researches of Dr. Frankland may be generalised as follows:—That gaseous substances have a point of incandescence which depends chiefly upon the density of the gas, and it follows that gases of low density become luminous much more readily than those of a high density; also, that gases which are not luminous at all at our ordinary atmospheric pressure (let us say hydrogen, for instance) when submitted to increased pressure become luminous. Thus a jet of hydrogen burning in a vessel in which the pressure was increased gave a light by which a newspaper could be read two feet from the flame on producing a pressure of two atmospheres.

Some connection may be observed between the theory of Davy and the experiments of Frankland from the experiments of Dr. Andrews, who has lately demonstrated the continuity of the liquid and gaseous state; or, in other words, that, when operating upon gases capable of taking the liquid form with great pressure, a certain stage is at last reached when there is no perceptible physical difference between the liquid and gaseous condition. Dr. Draper, of New York, in experimenting upon Davy's theory has, however, found that if on heating a strip of platinum to a temperature of 1,280° by the voltaic current a red heat was obtained which extended up to the line F (yellow) in the solar spectrum; at 1,325° the spectrum was prolonged into the bluish-green; at 1,440°, beyond the line G; and at 2,190° a pure and intense spectrum reaching as far as H in the violet was obtained. These high temperatures were measured by the expansion of platinum wire itself.

Now, it is extremely easy "in the mind's eye" to conceive the intense actinic power of the rays emanating from the incandescent vapours of the sun, whose beams are the storehouse of actinic power which actuates, we may safely say, this world of ours. We may extend these theories on luminosity to the sun itself without a great stretch of imagination; for it would seem to be merely one gigantic mass of incandescent elements, similar in every respect to those we meet with in our earthly experience. But here the temperatures which we would consider intense are only to be compared to the cooler spaces observed upon the face of the sun; the red and white heats of our forges would appear black by contrast to the intensely ignited mass beyond if placed upon the face of the sun. What were some few years since thought to be breaks in the photosphere of the sun are now known to be incandescent clouds of vapour of a lower temperature than the brilliant background. There is hardly a gaseous element, even at a low pressure, which is not capable of becoming intensely luminous; in fact, we can conceive no limit to the phenomenon.

M. Hirn accepts the theory of Davy, and believes that the greater part of the luminosity of flame is due to solid particles being formed or precipitated into the incandescent flame. If there were opaque solid particles in flame light would be reflected and would become polarised. Arago, years ago, observed that light from a flame is not polarised, and M. Hirn has confirmed these observations. Therefore, the latter-named experimenter comes to the conclusion that the solid particles, as they become incandescent, become perfectly transparent; and the rather curious observation that a flat flame, such as we meet with in a fish-tail gas burner, radiates light equally in all directions, although so irregular in shape, is thus explained. The real shadows produced by particles of carbon, says M. Hirn, which have escaped combustion, or the fumes of burning phosphorus, when compared with the striated and feebly-coloured shadows given by flames of very considerable solidity, show that the precipitated particles do not affect the transparency of flame, and, consequently, that when they become incandescent they become at the same time diaphanous (transparent).

A slight contradiction is noticed in connection with the magnesium light, which projects a real, and not simply a striated, shadow. Were this radical change in the optical properties of the solid particles not to take place—that is to say, the change from opacity to transparency—it is obvious that not only would such particles hinder the transparency of flame, but they would only illuminate from a very thin envelope.

It is easy to perceive the importance which these facts acquire when the temperature of an incandescent body, such as the sun, is studied. If the particles were opaque they would serve as screens, one for another, of all those situated in a straight line. Only the nearest to us would send out light; and these, besides being under less pressure, would be really less luminous.

It must also be recollected that other investigations than those referred to above tend to show that the upper layers of the sun's atmosphere are the coolest, and consist of hydrogen, sodium, and magnesium; that we have layers of iron and calcium at a higher temperature; and, again, layers of nickel, cobalt, copper, and zinc at a higher temperature still. M. Hirn's observation about magnesium is curious, and hardly seems to agree with the observation of Mr. Lockyer in the examination of one of the bright stripes called "faculæ." In this bright surface upon the sun's disc Mr. Lockyer observed a cloud which his spectroscope determined to consist of magnesium vapour. We, however, see at once how the different layers of vapours pass rays through their diaphanous or transparent brethren, and thus we get the full effect of the incandescence of those metals which are so rich in chemical force.

THE PRESENT STATE OF SPIRIT PHOTOGRAPHY.

There is only one professional spirit photographer in London, and business has thriven so poorly with him that in speaking of his commercial existence the past tense should, in reality, be employed. Within the last few weeks, however, the spirito-photographic quiescence of the metropolis has been greatly disturbed by the advent of a Parisian artist who "holds out" in the supernatural line. M. Buguet is a *gentlemanly*-looking man. We prefer to avoid giving a very close definition of the italicised word of qualification, because we know that "appearances are often deceptive," and experience has taught the world that some of the most unmitigated scoundrels ever sentenced to penal servitude, as well as some of the purest and best of men, have had this descriptive term applied to them. M. Buguet has a good appearance, and is of prepossessing manners. Not speaking English he is compelled to communicate through an interpreter. It had become noised abroad in France that this gentleman had obtained "spirit photographs" which were not merely more artistic than the English-made pictures, but were, technically, beyond suspicion. Parisian photographers had been present when "spirit photographs" were taken by him, and they had not discovered anything amiss, but, on the contrary, had been quite puzzled to account for the abnormal appearances on the plate. Why, then, should not M. Buguet resolve to become a missionary to this sceptical country, and convince those possessing faith *and* money that there is another world beside the present—one from which personal friends, statesmen, and even imperial personages return and stand motionless before a sublunary camera for such a period of time as the strength of our mundane light, the acidity of the bath, or the general turgidness of the chemical action may demand for the production of a photograph. M. Buguet acted philosophically. Why should he not "make the best of both worlds"—the spiritual world for the conversion or edification of those who might appear as clients, and the argentiferous or auriferous world, resulting as a deposit from the former, for his own delectation? With gain for all there would thus be real loss to none; hence a spirit photographic establishment was opened in Baker-street.

The public usually appreciate men according to the value they place upon themselves. Had M. Buguet opened an establishment or taken apartments in Ratcliffe Highway or the Waterloo-road few, indeed, would have been his visitors, and not more than two or, at most, three shillings could have been obtained from those desirous of possessing a photograph of their great-grandmothers or other deceased relatives or friends. The value of throwing out a sprat in order to catch a salmon is as yet imperfectly understood; but our Parisian spirit photographer had nothing to learn in that direction. "When I hab a ting I *hab* a ting," said the negro who ordered champagne while his fellows were drinking small beer; and thus it proved with M. Buguet. Hudson, of the Holloway-road, failed through overbashfulness and a lack of dash and enterprise; it was evident, therefore, that if failure was to be associated with the ghost photographer of Paris it would not be from such causes. He did succeed; the guineas rolled in; and, after a stay of a few weeks, he has departed with an exalted reputation and a plethoric purse.

But is it all genuine? Here we enter upon technical ground. When M. Buguet arrived in this country he, with his interpreter and agent, called upon us, and one of the party spoke of the desirableness of having what may be termed a "test" *séance* under circumstances which, when the details were published, would give assurance to the public that spirit photography was really and truly a genuine thing, and not a mere photographic trick. In the formation of a small jury of representative men—including members of the press and the amateur and professional element—we readily acquiesced; and an intimation was to be forwarded to us when it would be convenient to devote a few hours to this investigation. Meanwhile we apprised M. Buguet's agent of the conditions on which we should take part in the investigation, namely, that we should use our own binocular camera and take our own bath-holder and glasses, all the rest being provided by the photographer; that on our side Messrs. Le Neve Foster, A. L. Henderson, and E. W. Foxlee should be present, and on M. Buguet's side as few or as many as he chose; that he or anyone else should operate, but only in the presence of the jurors; and that the results be reduced to writing and signed by all present for publication. Many so-called "spirit photographs" have been taken; but the spirit-photographer has hurriedly left the country without giving us the promised *séance*.

Our reason for stipulating that a binocular camera should be employed was this:—Figures of some kind or other, in addition to that of the sitter, do undoubtedly appear on M. Buguet's plates. Now, if these are formed in consequence of any fluorescent "dodge" effected upon the background, the stereoscope would reveal it by showing it on the precise plane of the background; or, if it were obtained by some other means, the precise relation borne by the "spirit" to the sitter would be at once seen and imposture thereby detected, if, indeed, an imposter would have the hardihood to attempt a trick under circumstances which would infallibly lead to his detection. But we farther stipulated that our *own* camera should be used, because we know that by means of a camera constructed with a view to trickery of this description imposture might be rendered very difficult of detection. We can, for instance, construct a camera which we shall submit for examination to a jury of ordinarily sharp-sighted men not conversant with the application of the optical, mechanical, and chemical powers to this department of our art-science, and in which nothing of a suspicious or unusual nature shall be discovered, but by means of which, and under the strictest surveillance of the same jurors, we shall produce a great variety of "spirit" photographs, and this, too, even if the manipulations be performed by one of the party. Hence the necessity of a more than usual degree of care in imposing conditions which may be considered satisfactory.

Much publicity having been given to the assertion that Parisian photographers of eminence had been present and had failed to discover any trick, Mr. A. L. Henderson, who has acquired a certain amount of reputation in the metropolis in connection with ghost-trapping, wrote to M. Buguet, requesting him to operate in his (Mr. Henderson's) studio and with his camera. The reply was that Mr. Henderson might, on payment of twenty guineas, be permitted to see the whole operation; and when Mr. Henderson eventually wrote accepting the terms on the "no ghost, no pay" principle, an excuse was made that he (M. Buguet) was about to leave London and had not time to give the desired sitting. Other investigators possessing some knowledge of photography, he said, had been allowed to witness the preparation and development of the plate, and this, he doubtless concluded, should satisfy the scruples of sceptics. In the meantime sceptics are not only not satisfied, but are thoroughly *dissatisfied*, and will probably remain so, notwithstanding the vouchers for M. Buguet's *bona fides* emanating from some who have put themselves out of court by endorsing as *genuine psychological* manifestations certain tricks of clever conjurors at the Polytechnic Institution and elsewhere.

HOW TO EXTEND THE USEFULNESS OF THE BRITISH MUSEUM PHOTOGRAPHS.

We wonder how many of our readers know—or, having known, how many of them remember—that some few years ago the authorities of the British Museum permitted the photographing and publishing of nearly a thousand well-chosen subjects from their collection, generally admitted to be the best in the world. Although the photographs are sold at a comparatively cheap rate, how many have been able to turn them to a practical account in an educational direction—the main object for which they were intended?

These ideas occurred to us a few days ago, when we were privileged to spend an hour or two in the examination of five of

Messrs. Mansell and Co.'s magnificent volumes, which contained admirable illustrations of the antiquities of every known and many almost unknown parts of the world. The value of museums generally, and of the British Museum in particular, as educational agents is beyond all question, as we are almost exclusively indebted to them for the very advanced state of our knowledge of the whole circle of archæology at the present time. Great, however, as is the influence of museums, and especially of the larger and more important collections, it is, from the nature of things, restricted, and to a certain extent localised—personal inspection being possible only to the few, while the many have to be satisfied with their knowledge of the specimens at second-hand.

When, therefore, in 1872, the "British Museum photographs" were published we welcomed their advent with much pleasure as a step in the right direction, both because they conveyed, in a way which only photography can, a faithful transcript of the objects represented, and were procurable at a price within the reach of the great majority of those interested in the study of the antiquities of our own and other countries. We know that the photographs have been highly prized by students of nearly every branch of archæology, and we have several times seen them used with apparently much advantage in class teaching—probably the most important use to which they could be put, but for which, unfortunately, they are not, in their present form, well adapted. Teachers know that an illustration, to tell properly, must be seen coincident with the statement of the matter to be illustrated; but the 10 × 8 photograph cannot be examined at any considerable distance, and of necessity must be handed round the class. This is attended with such a distraction of attention and loss of time as to be impracticable; and therefore the not much better alternative of laying them out on the lecture table for after-examination is the course usually adopted.

In circumstances where money is not an object of consideration a remedy for this serious drawback to the usefulness of the educational series might be found in enlargements by some of the now nearly perfect carbon processes, as it would be no difficult matter to make them as large and easily seen as ordinary diagrams; but of course the necessarily high price of such enlargements would confine their use to the comparatively few. If, however, the publishers would issue them as three-and-a-quarter-inch transparencies on glass, suitable for exhibition in the lantern, all the difficulties would, we think, be at once overcome; and if they were sold at the average price of such pictures—about twelve shillings per dozen—we might safely predict for them a very large demand.

In most lecture rooms the lantern is now regarded as an indispensable portion of the apparatus; and as the lecturer has always at hand the means of bringing it into use, he would consider a set of such transparencies a positive boon. In addition to this there is a wide field open in the shape of mechanics' institutions and lecture associations throughout the country, which are beginning to find that a batch of single lectures on varied subjects is not attended with the amount of benefit expected from them, and are trying, instead, to arrange for courses of a dozen or so on one special branch. For such purposes the proposed transparencies would be eminently suited; and while their sale would, no doubt, adequately remunerate the publishers, their dissemination throughout the country would be found one of the most powerful educational agencies yet introduced.

We heartily commend the idea to the consideration of all who are interested in this matter, and hope to see our recommendation properly carried out in time for the forthcoming winter session.

We have received two communications, beside those which appear in the current number, from Mr. M. Carey Lea. We announce with regret that the contributions of our valued correspondent, after the appearance of the communications referred to, are again likely to be discontinued for an indefinite period. Owing to the state of his health Mr. Lea has been compelled once more to leave his native land for a season, in order to seek convalescence in the salubrious climate of the Engadine. We hope it will not be long ere our able *confrère* is permitted to return with health this time permanently re-established. In the meantime we direct attention to Mr. Lea's most recent emulsion process, further particulars of which are given in the present number. The article has been accompanied by a very charming specimen, to be seen at our office, and which shows abundant detail in a tree in shadow, while every stone may be traced in a building lighted by direct sunlight. It is important to observe what Mr. Lea says about the great power imparted by the addition of certain metallic nitrates to sensitive emulsion in causing it to retain good working properties for a prolonged period. It has been proved that one nitrate—that of uranium—does possess this property. It will be a useful addition to our knowledge to learn that other nitrates—those of copper and cobalt, for example—also possess the same property as that of uranium when mixed with bromised emulsion.

EMULSION PROCESS.

I HAVE obtained another curious result with my new form of the emulsion process, which will probably lead to a good deal of experiment, and, perhaps, change some established opinions on emulsions.

Plates prepared with albumen in the preservative, and without washing, act so differently from those obtained in the older methods that the idea occurred to me whether the modification of the film produced in this way might not extend still further. Emulsions treated in the ordinary way are found, after keeping for a few hours too long, to have their sensitiveness very much impaired, and to give greatly inferior results. It occurred to me that, possibly, the albumen bath and the omission of washing might counteract this deterioration; *and this proved to be the case.*

It is proved so far as a single experiment can prove anything, and that is, of course, not conclusively. My health has been such that I have not been able to continue the investigation, otherwise I should have tested the matter many times and in various ways before publishing. But, as I am about to leave home for a long time, I shall have no farther opportunities for investigation, and, therefore, I publish this result for what it is worth; and I cannot but consider it very significant.

Having on one occasion a small quantity of emulsion over I set it aside. On a subsequent occasion, when I was making plates, I took this residue, filtered it without mixing or addition of any sort, and coated an 8½ × 6½ plate with it, passed it through the bath in the same way as with the rest, and dried it. Comparing dates I found the emulsion had been kept nineteen and a-half days.

A fortnight after the plate was made it was tried by comparison; that is, after a plate made with fresh emulsion had been exposed on a subject, this trial plate was exposed on the same subject in such a way as to test its relative merits. The trial plate was developed, proved to have been fully equal in sensitiveness to that made with fresh emulsion, and, in fact, gave rather the better negative of the two, so that it was substituted and used for the purpose for which the other had been intended.

I send you herewith a print from this negative. You will notice that the foreground and, indeed, nearly half the plate is covered by a large, dark, evergreen tree, whilst the distance consists of a storehouse in sunshine—a combination fitted to test the powers of a plate. You will see that there is abundant detail in the tree, whilst the house is not unduly dense.

The details of the emulsion used for this purpose are—

Cadmium bromide*	7½ grains	to the ounce,
Ammonium bromide	1½ grain	„
Cobalt chloride	1 „	„
Potassium nitrite	1 „	„
Aqua regia	2 drops	„

sensitised with twenty-five grains of silver nitrate. Preservative bath—albumen, gallic acid, gum and sugar, and tannin, as described in full elsewhere.

From experiments made, which need not be detailed here, I am inclined to think that emulsions containing a fair quantity of *silver chloride* will be found to keep much better than those which do not contain it. In the above formula it will be noticed that there is a grain to an ounce of a metallic chloride, besides *aqua regia*, which, of course, leads to the formation of silver chloride also. If either the metallic chloride or the *aqua regia* had been left out, without proportionately increasing the quantity of the other, I am persuaded that the emulsion would have deteriorated much by keeping.

* Dried thoroughly after weighing.

I desire to rest somewhat upon this matter, and to invite attention to it, as my contributions to this Journal will for a long time to come be either very few, or, more likely, be wholly interrupted. It is one which interests me particularly, as I was the first to introduce silver chloride into the emulsion process, and I think its importance is even yet hardly recognised. In first writing on the subject, some years ago, I took occasion to say that the introduction of silver chloride in connection with silver bromide would be found to be as important as the introduction of silver bromide had been in connection with silver iodide in the wet process, and not dissimilar in its way of action. Experience has so completely confirmed this that I doubt if up to this day any really good emulsion plates have been made with silver positively in excess without the aid of silver chloride, either formed by the action of a chloride in the collodion or by the use of *aqua regia*. Even, however, were this successfully done, it would amount to very little. We know very well that in the wet process it is certainly possible to get good results with silver iodide alone, and without bromide; but in practice all wet-plate workers use bromide with the iodide. And with emulsion dry plates experience will settle down—if, indeed, it has not already done so—to the conviction that silver chloride occupies a corresponding and equally useful position.

To return to the matter with which these remarks commenced: there is no doubt that the rejection of the washing and the use of a compound albumen bath tend greatly to diminish, if not to entirely remove, the injury suffered by an emulsion that has been kept. When, also, this tendency to deteriorate has been checked by the free admixture of a chloride (and, probably, also of potassium nitrite) we get an emulsion that can be kept *without loss of sensitiveness*. This last is most important; *for it is easy to make an emulsion keep indefinitely by the use of metallic nitrates*. For example: if to an emulsion there be added a dozen grains to the ounce of cupric nitrate, dissolved in alcohol and rendered neutral, the emulsion can be kept for a long time, and will give most brilliantly-clean plates; but the sensitiveness, when carefully tested, is found to be materially diminished. In working with short-focus lenses and little stereo. plates these differences of sensitiveness are not much noticed; but with larger plates and longer focus lenses they become very conspicuous. Pure neutral dehydrated cobalt nitrate acts in the same way, but rather more favourably—that is, the diminution of sensitiveness is less. As for uranium nitrate, I have never worked with it in emulsions; I presume, however, it acts pretty much in the same way.

Some of these nitrates may do a little better, some a little worse. Eventually such additions will be discarded and forgotten. It will be found that the method described in this paper and the previous papers will be the permanently-useful one, perhaps with some modification. I have already explained why I have not been able to give the subject the thorough and careful study which it is my habit to do before publishing; but the specimen which I send will afford some indication that the keeping of emulsions is probably a much easier and simpler affair than has been hitherto supposed.

M. Carey Lea.

ON THE COMPARATIVE SENSITIVENESS OF IODIDE, BROMIDE, AND CHLORIDE OF SILVER TO WHITE LIGHT IN THE VARIOUS NEGATIVE PROCESSES.*

In two preceding articles I have endeavoured to prove—first, that of the three halogens (iodine, bromine, and chlorine) iodine has the greatest affinity for silver, and chlorine the least; and, secondly, that when iodide, bromide, and chloride of silver are exposed to white light in presence of nitrate of silver, and developed by acid pyrogallo-nitrate, iodide of silver is the most sensitive, and chloride the least. In the first case I gave five distinct reasons for the statement made; and in the second case I endeavoured to explain the fact therein stated as a consequence of the former result.

Before proceeding further with the subject I wish to offer a few more remarks on the comparative sensitiveness of the above three haloid salts of silver when exposed in presence of silver nitrate.

If *after* their exposure to light we wash the three films so as to remove the free nitrate, and then develope them with acid pyrogallo-nitrate as before, a good image will still be obtained, the washing of the exposed films not appearing to have any very marked effect upon the latent image. This is equally true of all three haloids. But if we wash the films thoroughly *before* their exposure to light we find that although a good image can even now be obtained, by means of acid pyrogallo-nitrate, upon the *bromide* and *chloride* of silver, yet only a very faint trace of one can with extreme difficulty be developed upon *iodide* of silver. Here, then, is a vast difference between the iodide and the other two haloid salts.

Let me state this fact once more very clearly, because it is a most important one.

If we expose to white light films of iodide of silver *plus* free nitrate, and then, *after* the exposure, wash off all the free nitrate, a good image can still be developed by means of acid pyrogallo-nitrate of silver. But if we wash off the free nitrate *before* the exposure scarcely a trace of an image can be obtained.

This proves that the presence of free nitrate is, in the case of *iodide* of silver, necessary to the formation of the latent image; and the fact is strongly in favour of the chemical theory of the latent image and against the physical theory, for in the latter theory the above fact is totally ignored and no explanation given of it. If light merely effects some molecular change in the iodide of silver, what can it matter whether free nitrate be present or not? But, according to the chemical theory, the free nitrate is decomposed and gives up its silver to the exposed iodide to form a new compound, viz., the latent image.

We shall see presently why free nitrate is not necessary to the formation of the latent image in the cases of bromide and chloride of silver.

Enough has now been said about the comparative sensitiveness of the three haloid salts of silver when exposed in presence of nitrate of silver and developed by acid pyrogallo-nitrate. We will now pass on to the next case to be considered, viz., that in which the three haloids, after having been formed in a nitrate bath, are thoroughly washed from every trace of free nitrate, organified, say, with gelatine, and developed by the alkaline and also by the acid methods.

I have already said, in reference to the development with acid pyrogallo-nitrate, under the above condition, that iodide of silver will scarcely give a trace of an image, even after an enormous length of exposure, whilst a good image *can* be obtained both upon bromide and chloride of silver. I regret, however, to add that I have not yet actually proved by experiment which of the two latter haloids is the more sensitive under the circumstances. In fact, my experiments thus far with washed and organified *chloride* of silver films have led to such strangely-contradictory results that I dare not draw any conclusions from them which are fit to lay before my readers in the present article. These anomalies seem to arise from the uncertainty there is as to the quantity of unconverted soluble chloride left in the films.

But, confining ourselves for a moment to bromide of silver, the question may be asked—Which is the more sensitive—a bromide film exposed in presence of free nitrate, or the same film washed and organified, both being afterwards developed by acid pyrogallo-nitrate? The question is a very interesting one, and the answer to it has much practical importance. It is that the washed and organified film is the more sensitive of the two. The reason of this I will explain presently, and the fact proves that those persons are in error who suppose that greater sensitiveness is to be got by exposing bromide of silver in presence of free nitrate; the contrary is the case, the washed and organified film being always the more sensitive.

And now for the explanation of this mystery. In the case of bromide of silver exposed in presence of free nitrate, the latent image is formed by the decomposition of the silver nitrate, the silver of which goes to the bromide to form a new compound. The sensitiveness of the film will therefore depend upon the affinity of bromine for *silver*.

In the case of a washed bromide of silver film the latent image is formed by the decomposition of water, the hydrogen of which takes the bromine, leaving the silver combined with a smaller quantity of bromine. The sensitiveness of the film in this case will, therefore, depend mainly upon the affinity of bromine for *hydrogen*.

Now, bromine must have a stronger affinity for hydrogen than it has for silver, or the water would not be decomposed in the latter case (for the affinity of the liberated oxygen for the silver is so small as scarcely to affect the result). This, then, is the reason why the washed film is more sensitive than the other.

We now come to the last case which need be considered, viz., that in which the films of iodide, bromide, and chloride of silver are all washed and organified, then exposed, and developed by the alkaline method.

In the case of iodide of silver not a trace of an image can be obtained in this way. In the case of bromide of silver a very perfect image can be obtained, with a wonderfully short exposure. In the case of chloride of silver the image fogs badly and no good result can be obtained.

My explanation of all this is as follows:—The affinity of iodine for silver is so strong that it will not leave the silver to combine with

* Concluded from page 301.

the hydrogen of the water. No latent image is therefore formed. But, even if it were, it is doubtful whether it would be developed by the alkaline method, because that method acts by reducing the latent image to metallic silver, its iodine being transferred to the alkali of the developer; but the affinity of iodine for silver is too strong to permit of this.

In the case of chloride of silver the film ought to be exquisitely sensitive—the most so of any under these circumstances—because chlorine has, of all the three halogens, the strongest affinity for hydrogen, and the feeblest affinity for silver. But, unfortunately, we do not yet know how to control properly the development of the image. The subject is full of interest, and well deserves the most thorough investigation. It is here, most probably, that an enormous stride will one day be made in the negative processes.

In the case of bromide of silver, the relative affinities of bromine for hydrogen, for silver, and for ammonium are so happily balanced that, not only is the film exquisitely sensitive, but it can be readily developed by the alkaline method.

I have now only one or two remarks to add:—If we take a washed and organified bromide film, expose it, then cut it in half, and develope one half by acid pyrogallo-nitrate and the other half by the alkaline method, the latter will show a vast deal more detail. There is a reason for this which we will discuss another time.

Again: If we compare the sensitiveness of an iodide film, exposed in presence of free nitrate and developed by the acid method, with the sensitiveness of a washed bromide film, developed by the alkaline method, the advantage appears to be greatly in favour of the latter when the operations are properly conducted.

In conclusion: Let me beg of such of my readers as are fond of experimenting and theorising to repeat carefully the experiments described in these three articles, and to aid me in arriving at the truth in the important questions which I have now endeavoured to discuss.

I am well aware that in my brief allusions to the latent image, as being formed in one case by the addition of silver to the haloid, and in the other case by the abstraction of a portion of the halogen, I have said nothing about what becomes of the liberated oxygen; but to have done so would only have complicated the question in hand, and I reserve for a future occasion the more thorough "go in" at the nature of the latent image and the part played by the oxygen and by the organifier in connection with it.

All the leading phenomena of our negative processes, so far as the comparative sensitiveness of the different haloids is concerned, are now, I hope, explained by means of the relative strength of affinity of iodine, bromine, and chlorine for silver and for hydrogen. The order in which their affinities stand for silver being iodine, bromine, chlorine; and for hydrogen the reverse of this, viz., chlorine, bromine, iodine.

THOMAS SUTTON, B.A.

ON DUPLEX IMAGES.

[A communication to the Liverpool Amateur Photographic Association.]

THE negative now brought to your notice is that of the parish church of Denbigh, North Wales, called "Eglwys Wen," or "White Church," in which the two east windows face you as you enter, the western wall at your back being very uneven as regards surface, and of a dirty yellow colour.

On placing the camera in position no image was observable; yet, on the completion of the exposure—twice, on two separate occasions—the two east windows, the one plainer than the other, appeared in an inverted form as floating in the air between the pews and the camera. At length, on a third trial, a picture was obtained without it. And now to describe the conditions under which the first two were taken, of which one negative is before you.

First, as to the light. The time selected was from ten to twelve on a dull day, after the strong light had ceased to pour in from the eastern windows, and the side light was stronger than the front. In order the better to ensure having only the light from the object itself the camera was placed *behind* the half-open door. A five and a-quarter inch wide-angle rectilinear lens, by Dallmeyer, with open aperture, was used on the occasion. The exposure in the two first instances was 105 minutes, the windows on the south of the church being old and yellow. You will see the result.

The perfect negative was obtained under slightly-different conditions. The time selected was a bright afternoon from two to four, the sun being then more westerly, leaving the east end in a comparatively dull light. The door of the church was placed wide open, and the camera, with a five and a-quarter single wide-angle landscape lens, by Dallmeyer, with a 9 × 7 plate, was exposed forty-five minutes, standing in the diffused light. No spirit image appeared. The negative was clean and free from stains. Half-an-hour after its development, when the bright light in the south-west had subsided, and the eastern sky, from refraction from the western, was brightening, the inverted image of the window was seen making its appearance in the old place, and, on closing the door of the church, it became stronger. I can only account for it thus:—The western wall at my back acted in the same way as a pad of red blotting-paper at the back of a sensitised plate, the air between it and the pews being a focussing-screen; when the direct light was greater than the diffused the image appeared, and *vice versâ*. The church is a very cold and damp one, being thus favourable to such a state of things, and conducing highly to the sensitiveness of the plate, that of forty-five minutes' exposure not being stained in the least. Damp atmospheres, I think, conduce to such appearances.

After a storm of rain, in photographing the north transept of Tintern Abbey, I obtained the mullions of a window situate high up in the gable, and also the five mullions of the western window, both being reflected apparently on the ground a short distance in front of the subjects. The latter picture was largely bought by an American medium to support his theory of the spirits of nuns appearing in the holy Abbey. Opposite to each of these windows was a mass of dense air, with trees and cliffs at the immediate background, similar as regards photo. colour to that of the western wall of the church.

W. HARDING WARNER.

ACTION OF GREEN LIGHT ON A BROMIDE FILM.

I LATELY made a rather curious experiment, which seems worth recording on both theoretical and practical grounds.

In testing some collodions I exposed some chloro-bromide plates at a house. The light was bad, the house of rather dark stone, sky completely overcast, rain falling, and image on the ground glass dull and faint; time, between one and two p.m. I used a nine-inch Steinheil aplanatic; stop, about $\frac{f}{24}$. With wet collodion I should have given not less than a minute and a-half. With my dry plates I gave two minutes. That which was made with my regular collodion, two months old, gave a fully-exposed negative, which easily came up to printing density in the alkaline bath. The latter was begun with one and a-half grain of ammonium carbonate to the ounce, and was ended with four grains to the ounce. No pushing of any sort was used; even very cold water was employed, whereas I generally use water at 70°, which in the present case, if used, would have brought down the exposure one-fourth and made the plate fully equal in sensitiveness to a wet plate.

I am particular in making the sensitiveness of the plate evident, because it bears strongly on what follows.

Before developing this plate I took two thicknesses of dark buff paper and with it covered half the film. I then held the plate, with one half thus protected, close to a pane of green glass, behind which burned a gaslight. The conditions of the trial are worth noting. The light was a powerful argand burner, with the flame turned up almost to the top of the chimney, and placed as close behind the glass as possible without danger of cracking—about three inches. The sensitive plate was held not over an inch from the other side of the glass, and exactly opposite the burner. *It was kept in this position for sixty seconds, fairly counted.*

On examining the developed and fixed plate by daylight *not a particle of difference could be detected between the two sides.* Both were clean, sharp, and free from fog or veiling. Had I not made a memorandum on the back with a diamond I could not now tell which half had been exposed and which shielded. The subject was one well suited to have shown any difference of effect, for the middle line crossed a uniform foreground of grass, then divided the stone wall of a house, and finally crossed the sky, the even tint of which should have shown a difference had any existed. But the two halves of the house were of equal intensity, and gave not the faintest indication of difference of exposure.

I long since affirmed in your columns that foliage impresses itself on the film, not by virtue of the green light which it radiates, but by the white light which it reflects. And in my *Manual of Photography* it is laid down that an additional quantity of bromide in the collodion used for landscapes with foliage is useful, *not* by reason of sensitiveness of silver bromide to green light, as generally said, but because a large proportion of silver bromide reduces contrast. And where there is foliage in the foreground combined with well-lighted distances the contrast is apt to be too great. Silver bromide has undoubtedly a slight sensibility to green rays; but this sensitiveness is too slight to be of any practical use. These views, which I have entertained and expressed for many years, find their confirmation in the experiment here described. To give to this experiment its full significance I should mention that the green glass used was by no means very dense or dark, but was the green glass by which my light is always shaded in developing. I have frequently endeavoured to induce photographers to save their eyesight, which cannot but be injured in the long run by developing and working in an irritating red glare, whenever they can accomplish all their objects with entire comfort in a pleasant green light. And if a very sensitive *bromide* plate can bear such exposure as I have described without injury, it is clear that iodo-bromised wet plates will be perfectly secure. The green glass which I use lets abundant light through for all my operations. I can watch a development with perfect satisfaction, measure out chemicals, and, what is much more, can read numbers or memoranda noted on the backs of plates with a diamond at a distance of two feet from the green glass shade.

These facts will give a pretty clear idea of the amount of light which passes through my green glass; and if a bromide plate will bear this quantity of green light without being impressed, I think my statement of years since, that no useful green light emanated from foliage, is amply proved.

But this experiment has yet another bearing. My friend M. de Constant and I brought forward some years ago the subject of auxiliary exposure, which has since attracted so much attention. We both fixed on pale rose colour, and on exchanging specimens of the colour we had fixed on they proved to be identical. At first I thought the red colour had much to do with the effect, but afterwards inclined to the belief that the white light which the rose-coloured paper reflected (and probably also radiated, for the colour was a pale rose wash on white cardboard) was in reality the active agent, and that if I had lined my camera with grey paper, not too dark, the same effect would have been produced. The rose colour was useful in subduing the effect and preventing an excess of light.

Even green glass will allow some white light to pass through it when the light falling on it is very strong—for example, full sunlight—so that paper prepared with silver iodide and exposed to sunlight under green glass will receive a developable impression; but the source of light must be very strong. This leads to the conclusion that green glass is perhaps not the best means for giving an auxiliary effect in the camera. The plan lately suggested of covering the lens with opal glass seems promising, though I see no reason why *tissue-paper* should not answer equally well and be more manageable. But, after all, I doubt if any plan be more useful than that which I originally suggested, of using pieces of pale rose-coloured cardboard inside the camera, and placing them only on the sides adjacent to the worst-lighted part of the landscape, thus localising the effect, where needed, instead of extending it over the whole film.

M. Carey Lea.

NEW EMULSION PROCESSES AND THE ADDITION OF ORGANIC SUBSTANCES TO THE PYROXYLINE.

The morning I received the number of The British Journal of Photography containing Mr. M. Carey Lea's new albumen process I was about to use an emulsion prepared the evening previously, so I at once dissolved some gum arabic with the quantity of sugar recommended. But I was greatly puzzled to know how the albumen and tannin would behave, because so many workers of the old tannin process have recommended that the tannin preservative can be clarified by adding a little albumen to it, which is coagulated and carried down as a precipitate with the resin and other impurities. A too strong dose of albumen weakens the tannin solution very materially. This matter has frequently been reported upon in this Journal, as it was brought forward amongst other discussions which occurred at the Liverpool Amateur Photographic Association, and I have myself also recommended it in these pages.

The albumen was prepared by adding eight minims of glacial acetic acid to the white of each egg. Not being in possession of Beaufoy's acetic acid No. 8, I supposed the glacial to be about three times stronger than the No. 8 in question.

The gum being a viscid substance and mixed with the albumen, I did not expect the tannin would be able to precipitate it, although it must inevitably be effected and make it leathery. It is the statement of a medical authority that a person drinking a pint of coffee to breakfast and eating an egg with it manufactures in the stomach as much leather (in the course of twelve months) as would make a lady a pair of boots! The tannin in the coffee performs the office of currier in a very unconscious fashion, unless the individual in question has the instinct, mentioned by Dr. Johnson, of man always associating eggs with bacon.

I thought, possibly, the "instinct" portion of Mr. Lea's preservative might be the gum in acting as I have supposed it would. However, when it was all made up and mixed together it looked very much like ordinary coffee supplied plentifully with milk. After preparing about half-a-dozen plates, and allowing them to dry for twelve hours, I exposed on a foreground of trees, and developed with ordinary alkaline developer. The picture appeared readily enough, but was totally ruined with blisters owing to my having used a substratum of albumen. I came to the conclusion that even on the score of quality the old-fashioned tannin preservative was quite its equal, or, indeed, the equal of most other preservatives that have been introduced as the offspring of painful research, exhaustless experiment, and, I would add, confusion.

Mr. Lea says this is quite equal to a wet plate in every quality; but there has been no process of the half-dozen that Mr. Lea has brought forward for which he has not claimed the same great recommendation, yet in their turns they have been consigned to the photographic limbo, after a very ephemeral existence, to give place to another seedling, to die the same natural death after the photographic world has "interviewed" it and worn off its laurels.

Is there a quick emulsion process that has stood unaltered in its formula for the short term of six months without being superseded by another "*quite equal to wet?*" Mr. Lea is, doubtless, very enthusiastic, and I should place him, as a photographic chemist, as quite equal to any one contributing to the pages of this Journal, which, I should say, embraces about the most successful manipulators in this country. I have lost a great deal of my respect for very quick emulsion plates—indeed I may say I have never been yet galvanised *into* the belief. I know little of Spanish three-per-cents., but I share Mr. R. M. Gordon's disrespect for the quick emulsion plates to which he compares them.

Mr. Lea has got himself into hot water by claiming to have *discovered* the importance of placing the collodionised plate direct in the preservative without any intermediate washing.

When the Rev. St. Vincent Beechey declared the "*accidental* circumstance" of his having put a plate direct into this beer preservative and obtained a good negative he challenged photographic sceptics on the subject of excess of silver. I was then corresponding with the reverend gentleman on another matter. I reminded him that "photographers always add a little silver to a beer preservative for the purpose of throwing down the chloride that is found in nineteen-twentieths of all samples of that article." "If but a trace of free bromide be present a gum preservative may be saturated with nitrate of silver almost to crystallisation, and the development of the negative will be as free from fog as can be."*

The gentleman who accidentally foresaw that free silver in a preservative was not absolutely ruinous had not read the "voluminous correspondence" of The British Journal of Photography, or, rather, had not "made a note of it."

Mr. W. H. Davies is slightly severe on discoverers who have not read photographic literature attentively; I therefore call his attention to my suggestion of adding silver to the beer, June 14, 1872, which was then an old piece of information crammed away in some corner of my brain for future use. I think I may fairly claim to be the sixth discoverer of this little modification, and whether Mr. Davies is to rank fifth or seventh, I leave him to select his own numerical position.

In the matter of dipping the plate direct in the preservative, Mr. Lea, Colonel Wortley, and Canon Beechey had better arrange themselves in consecutive order; for, as an emulsion worker of over half-a-dozen years' experience, I may claim to having had similar accidents, and I know many (probably a dozen) who were just the men to commit the blunder.

Tannin and free silver will never be a safe preservative; for if a plate be but slightly washed, leaving greasy lines on it, and the plate contain free silver, the negatives will develope the colour of dingy red without half-tint. But if a plate be submerged in the tannin solution the surface silver is in a degree washed off by it, and is decomposed and falls to the bottom of the dish; or if the solution be put away in a bottle a scum attaches itself to the sides of it. I intend trying the keeping quality of these plates with washed-off preservative, finishing by a gallic acid solution, but my faith is small.

Some time ago I was preparing plates by a modification of the Blair-Adams process. My first washing water had grown to be about five or six grains rich in silver. The plate was dipped into the alkaline gum, the excess of gum swilled off, and again flooded with a little silver and acetic acid. This, as I supposed, permeated the collodion film and gave sensitiveness to it. I then washed more perfectly and dipped into tannin and gallic acid. By an accident I occasionally dipped the tanninised plate into my first washing

* See The British Journal of Photography, June 14, 1872, page 285.

water; but when one slipped off the dipper I was compelled to teem it out to secure the plate, when I found half a teaspoonful of metallic silver adhering to the bottom of the bath. This shows the action of silver and tannin when used together.

I have made very quick plates by excess of silver with *aqua regia* in the collodion and the Blair-Adams preservative. When the plates had been only slightly washed they would keep about a week or ten days. After that either fog resulted or that objectionable red colour with a sandy deposit which no one accustomed to use better plates would tolerate in the least degree. This is evidence that we must not look for keeping qualities in a plate having silver in combination with tannin.

I see Mr. Stillman gives a formula for quick emulsion plates in the work on photography he has just published, and evidently has discovered a process which harmonises with preconceived notions of the requirements of a bromide emulsion plate, viz., having a trace of free silver present before development. That such an emulsion will keep at least for some months is quite evident, and combining rapidity of exposure in the camera. I am willing to believe it if the quality of the negative will satisfy Mr. Stillman.

I was led to experiment some time ago, somewhat after the fashion of Mr. Stillman, by allowing two or three grains of nitrate of silver to combine with the organic matter contained in the pyroxyline, or, rather, the nitro-glucose, and after standing a week or two added five and a-half grains of bromide of magnesium, and afterwards sensitised with ten grains of nitrate of silver and a drop or drop and a-half of *aqua regia*. The advantage was not clear to me, so I did not prosecute it further, although I have made frequent improvements in my ordinary emulsions by the addition of a drop or two of an alcoholic solution of nitro-glucose, which might have been more manifest if used with this modification. However, Mr. Stillman has been the first in the field, and is quite capable of telling us nearly all that is worth knowing respecting emulsions, if not about photography in general.

I will just mention an experiment that I have made in connection with the manufacture of pyroxyline, which Mr. Stillman may find equally as useful as that which he has himself made. At the time of immersing the cotton in the acids at 160°, I likewise with each 100 grains of cotton added three or four drops of syrupy grape sugar, which, being acted on by sulphuric and nitric acids, was converted into nitro-glucose—an article for which, I find, some photographic chemists charge the modest sum of six shillings per ounce.

From correspondence in this Journal everyone declares that it is requisite to have a particular or specially-made gun-cotton. This may be true in a degree; but I have found that all the various samples I have experimented with answer well if the collodion be kept a month or two before use. Mr. Wilson—a most excellent emulsion worker—has declared this fact many times before the Liverpool Amateur Photographic Association. I have never had better collodion than some which I made from a sample of French cotton obtained from Messrs. Johnson, of Liverpool, and which, speaking from memory, cost about half the price usually charged for the "specially high temperature." I purchased this cotton at least on half-a-dozen separate occasions, and I found it uniform and of good quality, and probably the firm supplied it to twenty or thirty other customers who were succeeding equally well with it as myself. I mention this because I find photographers shun the emulsion process as they would an infuriated bull, and some express their contempt for the thousand-and-one complications declared as essentials to success.

Mr. M. Carey Lea, at the expense of a little trifling trouble, adds two or three foreign substances to the collodion and five or six more to the preservative, and expects to obtain converts to his process. When I began to try experiments with preservatives I always compared the results with the negatives taken with the tannin, grape sugar, and gallic acid, and for uniformity of good results I very much question whether I produced better negatives this year than I did seven years since. This is no fancy on my part. For instance:—Three or four years ago I was preparing architectural drawings for a sketch-book intended for publication in the United States. It was essential that the negatives should have the detail distinctly visible, or I would have been unable to reproduce the work in a drawing. My tea plates stood highest in this respect, the collodion having in it about four grains of silver in excess of the bromide, to which I added three drops of *aqua regia* to two ounces. It was simple and certain, and the plates would keep at least three or four months.

Albumen as a preservative showed a finer deposit, but the details were not rendered any more distinct. Gelatine was about the same and more easily to develope, whilst a gum preservative was equal to either of these two; but the fault of blistering was one that I could not battle against.

Tannin has somehow earned a name for producing hard negatives. I can only account for it thus:—That it produces negatives when other preservatives would produce nothing but a misty blur; and because the picture comes up on the immediate application of the developer it is then looked upon as over-exposed. When a tannin plate comes up slowly and acquires great density in the high lights it is conclusive proof that it is under-exposed and over-developed, and not quite so valuable as a clean piece of glass. The sky must show a slight transparency or the negative can have no softness, and this softness is obtained by a lengthy exposure and judicious development.

I was looking at a number of negatives the other day which belonged to an amateur. The buildings in the landscape were of but slightly different tone (as far as intensity goes) from that of the sky above. They were exposed, I should imagine, about one-third the time I should have given them, and probably developed three times as long.

When you fail with an emulsion process having too many handles to turn before it comes right try a tannin preservative, or a cup of strong tea with or without sugar. If you want to give quick exposures buy a Howard tent. If you insist upon trying a quick emulsion process keep a record of your failures for the benefit of fellow-photographers, and if you obtain six good negatives out of six dozen exposures send prints from them to the next Photographic Exhibition, and get voted on the committee of one of the London photographic societies, or probably the "Dry-Plate Club" may elect you. J. W. Gough.

Our Editorial Table.

Views in the Isle of Wight. By Jabez Hughes, Ryde.

To every person connected with photography and photographic literature the name of Mr. Jabez Hughes is familiar as that of a lucid writer on photography, and *habitués* of the photographic societies in the metropolis esteem him as a clear thinker and a forcible and ready speaker on matters photographic. We have at present to refer to Mr. Hughes only as a photographer—a mere "taker of pictures"—the pictures in question being a series of views of charming scenery in the Isle of Wight.

Not many weeks have elapsed since we gave detailed particulars of the construction of Mr. Hughes's studio, or, more strictly speaking, of the glass house of his studio; but, in the taking of these insular views, neither Mr. Hughes's studio, with its perfect lighting, nor any other part of his truly regal establishment in Ryde counts for anything, for home refinements and elaborate accessories do not in any way aid the photographer who operates at a distance from his well-appointed *atelier*, and amid all the discomfort of field-working in a portable tent. Peripatetic photography of this kind is what tries a man's mettle.

The "British Madeira," as the Isle of Wight has been very suggestively designated, is a most fertile field for the pictorial operations of the photographer, who may within its precincts find nearly every description of scenery. Sometimes it assumes a sylvan character, and at others that of imposing grandeur from the precipitous, rugged, and elevated nature of its cliffs; beautiful bays on one hand, and almost barren "downs" on the other; here groups of cottages and cottagers whose manners are yet as primitive and simple as those depicted in his word-pictures by Legh Richmond in the "Dairyman's Daughter" (the scene of which popular work is to be found in this island), and there hotels and edifices replete with all the elegancies and luxuries of this refined age, causing the visitor for the moment to imagine that he is in a wealthy suburb of our opulent metropolis. Everything, however, is in miniature, and the transition from one class of scenery to another is effected without much personal exertion or loss of time. The "silver streak," which is visible from nearly every eminence in the island, looks animated with shipping of all proportions, from the huge men-of-war proudly riding at anchor at Spithead or Portsmouth to the graceful yachts—each "a thing of life"—which find congenial homes at Cowes, Ryde, and other favourite haunts in the island for these beautiful specimens of the more diminutive class of marine architecture.

Ventnor has proved prolific in providing subjects for Mr. Hughes's camera. It is situated on what is familiarly termed "the other side of the island," and is built upon the steep slope of a hill side. The houses rise over each other in tiers, presenting a charming appearance. In his view of *Ventnor, from the Pier*, Mr. Hughes has managed to secure in a most effective manner both a portion of the town and the beach with the surf dashing against it, forming a pictorial delineation which in the present tropical weather imparts an idea of refreshing coolness while contemplating the breezy atmosphere of the picture. Scenes at the *Undercliff*, and at *Sandown Bay*, are so selected and photographed as to do ample justice to Mr. Hughes's artistic reputation. But while admiring the numerous yachts photographed from, and groups of health and pleasure seekers caught by the camera as they lounge upon, Ryde Pier, and bestowing our meed of admiration on the skill as well as the patience displayed in securing the moving and ever-changing shipping so as to make a picture of the whole, we must reserve our special praise for some views of the beautiful village of Shanklin, with its elegant villas, its hotels in the *cottage ornée* style, exemplifying the "pride that apes humility," and above all its famous "Chine"—a deep and very picturesque ravine, of which Mr. Hughes has secured several effective views. One of these, of larger dimensions than the others, possesses exceptional excellence from the balance of the composition, softness of the lighting, perfection of the foliage, and its general qualities as a photograph.

The majority of these views are what are termed "instantaneous"—a fact evidenced by the busy scenes depicted in many of them, and in which the actors could not possibly have been drilled into position; more especially when such untutorable *matériel* as rapidly-scudding ships and waves dashing against rocks are found included in the scenes portrayed.

The Isle of Wight is evidently a paradise for the photographic tourist, and we commend it to the attention of those of our readers desirous of having an "out" with the camera this summer, but who have not yet decided upon the locality intended to be the scene of their artistic labours.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 15	Bristol and Clifton Amateur ..	Philosophical Institution, Clifton.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The sixth monthly meeting for the present year took place on Tuesday, the 30th ult., at No. 15, Oldhall-street,—the Rev. T. B. Banner in the chair.

The minutes of the previous meeting were read and passed, and Mr. W. B. Roberts and Mr. L. W. Weber were elected members of the Association.

The Secretary gave an account of the excursion to Rhydymwyn, and prints were exhibited of the views taken.

Mr. Atkins said his negatives were taken by Mr. W. B. Bolton's process. He was much pleased with them, and had no doubt they were an improvement on the old way of preparing the plates.

The Secretary read a communication from Mr. P. Mawdsley on the development and manner of using the new Liverpool dry-plate emulsion.

Mr. Atkins exhibited one of M. Janin's photographs in *bas-relief*. He (Mr. Atkins) stated that he had sent, as per advertisement, 7s. 6d. "for specimen with instructions," to Mr. J. Solomon, Red Lion-square, but in reply only received the print exhibited and *terms* on which copies from photographers' own negatives could be obtained. He (Mr. Atkins) complained to Mr. Solomon that he had paid for instructions, but could get no redress.

Some surprise was expressed by the members that so respectable a house did not at once rectify a mistake when an advertisement was so misleadingly worded.

[We have always understood that the "instructions" referred to in Mr. Solomon's advertisement alluded to the means to be adopted by photographers to get their works executed by M. Janin, and that the word "instructions" was in this case intended to be synonymous with "terms." In point of fact, Mr. Solomon is not acquainted with M. Janin's method.—Eds.]

A print, and also a negative, which had been sent by Mr. W. H. Warner, of Denbigh, for inspection, was handed round. The negative—a church interior—was a curiosity in photography by reason of its having an inverted copy of the distant east windows seemingly floating a short distance from the camera, showing distinctly the window panes, &c., the inverted windows and the windows proper being the same size on the negative.

The Secretary read a communication on the above subject from Mr. Warner. [See page 327.] A discussion arose, but no definite conclusions were arrived at about the subject of the paper.

A vote of thanks was passed to Mr. Warner for his communication, and also for a beautiful 10 × 12 print of the now-celebrated Denbigh reredos, which Mr. Warner had kindly presented for the Association's album. The print was much admired; for, though very difficult to take, owing to the cross lights in the church, it was as perfect as if taken in a studio.

Some gelatine and other negatives were exhibited by Mr. W. H. Kirkby, and Mr. Cooke showed some prints taken on Durand's paper when quite discoloured and afterwards kept fourteen months before toning. They showed very little difference from prints prepared in a more rapid manner, and were quite passable.

The meeting was shortly afterwards adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

At the first May meeting of this Society the chair was taken by Herr Prümm, who apologised for the President's absence.

An extract was read from a letter by Herr Scarstenbardt, wherein he stated some dry-plate troubles with the "Harz" process. He had prepared a few plates some days before, and found that when he placed them, after exposure, in a bath of distilled water to moisten the film the surface split all over so as to render the negatives useless; yet the plates were made exactly according to the formula in Dr. Vogel's *Lehrbuch*.

Herr Schaarwachter remarked that he had worked the process with much less resin in it than the seven grains to the three ounces of collodion recommended in the formula in question. However, he had found that after half-a-dozen good plates or so the bath went wrong, and gave thereafter only persistent fog. He had never been able to find the means of restoring it.

The Chairman read a note by Dr. Vogel on Herr Scarstenbardt's letter, wherein he recommended albumenising the plates, also that the resin should be reduced to a fifth part of that given in the published formula—as it was, in fact, stated in the revised edition of the book in question.

Herren Taeschler Brothers wrote describing an ingenious method they had of working-in backgrounds so as to obtain any desired effect. They varnish the back of the negative—which may have been taken with a designed background placed far back to be out of focus, if desired—with a matt varnish, and then work in effects upon that with the pencil.

Herr Reichard said the pictures done in that way were very nice; but he doubted whether the plan was likely to come into general favour, as the working-up of one of these backgrounds took, for one thing, a great deal of time, and required a large amount of artistic taste and much technical skill.

Herr Techner did not think the artistic qualities displayed in the samples before them of a very high order.

Herr Lindner and the Secretary both entered at length into the discussion of the subject, but it is not of sufficient interest to warrant our presenting it to our readers.

Herr D. Friedlander laid a collection of Woodburytypes before the meeting, and gave some details of the progress of Mr. Woodbury's London establishment, now ten years' old. Difficulties, chiefly mechanical (he said), stand in the way of pictures being produced there larger than fourteen inches square. One printer, when everything is in working order, can produce 30,000 prints a week. From one negative, at the time of the Duke of Edinburgh's marriage, a million prints were produced in a very short time, and a picture of some stage celebrity is printed every week at the rate of 35,000 per week for a theatrical paper. These, and many other interesting details which most of our readers already know, were set forth.

The Chairman said it was commonly supposed that the process was patented in Germany, and that Bruckmann held the patent. That was not the case, however, and Mr. Woodbury was taking steps to extend his business in Germany himself. As it was, far more Woodburytypes came to that country than was generally imagined. About twenty-five per cent. of all that came from England were thus produced, and were often sold for silver prints. He (the chairman) had once to deliver a thousand copies of a cabinet negative in an extremely short time, and could not have done it in the ordinary way. By sending it to England he had prints and all back in three weeks' time. It would have been impossible by any other means to flood the market with portraits of the Shah so suddenly and fully as was done at the time of his visit.

There was no other business of importance, and the meeting was shortly afterwards adjourned.

Correspondence.

Emulsion Process: Use of Aqua Regia.—Backing Dry Plates.—Hot Development.

I do not know whether it is more annoying or amusing to receive the assaults and advice of some of your contributors, especially on matters with which I am probably more familiar than they. Colonel Wortley advises salicine in place of some other constituent of my preservative formula. I had used salicine and rejected it before Colonel Wortley used his first plate after my method. Canon Beechey "implores" me to abandon the use of *aqua regia* in favour of hydrochloric acid. Some time back I saw an urgent recommendation to modify my formula by avoiding hydrochloric acid, and using simple nitric acid. *Quot homines, tot sententiæ.* I tried the mineral acids carefully years ago, when I first introduced their use, and found that *aqua regia* worked better than either of its constituents separately. The great mistake made by some of your correspondents in writing about *aqua regia* is to speak and reason respecting it as if it were a mere mixture of hydrochloric and nitric acid, instead of owing its intense activity to the presence of bichloride of nitrosyl, which is formed when the *undiluted* acids are mixed and heat applied, as I have always directed. Canon Beechey falls into this error, as have several others of your correspondents whom I have not thought it necessary to set right; but, as Canon Beechey addresses me pointedly on the subject, I explain why the same results do not follow when hydrochloric acid is added to a dilute solution of a nitrate as when the strong acids are first mixed under conditions giving rise to the formation of *aqua regia*—a substance which will always be found the corner-stone of the emulsion process.

It is not possible to get rid of blurring by the use of yellow, red, or black paper; such a recommendation shows absence of acquaintance with the origin of the difficulty. I remember once receiving a specimen print in proof of the excellence of one of these methods. The specimen itself was badly blurred.

One of your correspondents remarks upon the trouble caused by the use of ochre pastes on the backs of plates. I think his objection is well taken. Nothing containing particles likely to rub off or become in any way detached should be used. Nothing is so good as annotta—the original substance recommended, I believe, by Major Russell. It never turns to dust, and, when mixed with a little glycerine, makes a tenacious layer which remains in close optical contact and gives off no dust. I have known it to keep good and effectual for two years when properly applied. The only objection I have ever found is that in excessively-damp weather the coating may become moist. I never saw that happen but once, and then the air was so very humid that ink would strike through thick letter-paper, and a piece of sized paper left upon a table felt like a wet rag. Collodionising the back with strongly-coloured collodion is a very neat method, especially if a very little glycerine be added to the collodion; but the cleaning off is more troublesome than with annotta.

I do not know whether many dry-plate workers use the warm development, but it is undoubtedly a great convenience. I have spoken of it occasionally in past years, and continued experience shows me that there is always a gain of softness and detail from its use. In all landscape photography it is desirable to shelter the exposure as much as practicable, because of the wind. Days of absolute stillness combined with a desirable light are very rare. It is one essential advantage of the dry processes that the lens may be capped as often as may be desired, and the exposure may be made up of half-a-dozen portions whilst the wind is still. Of course, with stereo and other small plates there is no difficulty; but when larger plates are used, the trouble with the disturbance of foliage becomes serious, and this is the great reason why highly sensitive plates are so desirable. The use of a bath to develope in, made with water at about 100° Fah., certainly enables one to shorten the exposure by a fourth or a third. The pan used must have been rinsed out with hot water, so that it may not too rapidly chill the bath.

The capacity of dry plates to bear hot developers without fogging varies very much with different kinds. The albumen plates made without washing, such as I have described in your columns, bear the hot bath perfectly, and show no more tendency to fog than with cold developing.

In an editorial article contained in a late number the writer remarks upon the formation of precipitate in preparing the bath. The cause of the difficulty was explained in a letter from me which appeared, as it chanced, in the same number. The precipitate arose from adding the constituents in the wrong order. By attending to the directions given by me in your number for May 29th no difficulty can arise.

Philadelphia, June 16, 1874. M. Carey Lea.

Dr. H. Napias on the Use of Cyanide of Potassium in Photography.

Although one of the staff of this Journal will no doubt give the substance of what Dr. H. Napias has got to tell us in the *Moniteur* about the hygiene of photography, yet his remarks on the use of cyanide of potassium are so important that I will venture, even at the risk of repetition, to refer to them pretty largely in this letter.

Nothing is more common amongst photographers than the use of this dangerous poison for fixing their negatives. In one-half of the dark rooms which one visits one's olfactories are regaled by its fumes, and one is glad to escape, although the misguided operator submits to the inhalation of them for hours per day, from day to day, week to week, and year to year. Does he really believe that it is *not* highly risky and injurious to the health to dabble with this dangerous substance—the most dangerous poison known to chemists, and the most rapid in its effects—and to breathe its fumes? Then let me beseech him to consider the many cautions which he has received, and not to turn a deaf ear to the additional one which Dr. Napias has just committed to print.

Dr. Napias tells us that all chemical substances exert upon the human organism special disturbing effects, which, when wisely regulated, become in medicine important elements of action; but, when employed unreasonably, or in too strong doses, injuriously affect the health and produce what is called poisoning. Amongst the really dangerous poisons employed in photography are cyanide of potassium, nitrate of silver, bichromate of potash, and bichloride of mercury.

Cyanide of potassium, we are told—and now for the hundredth time—is, of all poisons, one of the *most* dangerous, even in weak doses. It is one of the most easily absorbed, and in its effect the quickest, scarcely permitting time for the action of an antidote. It is most desirable, says Dr. Napias, that it should be banished altogether from the photographic laboratory. Its energy is such that a cut or scratch, being an open door for its absorption, may be regarded as an open door to death!

Did I not say as much a few weeks ago? And did not the "Peripatetic" laugh at me for the caution? Beware, dear friend, lest your own life, so valuable to us, be sacrificed one day to your indiscretion when you least expect it.

The symptoms of poisoning with cyanide in small doses are—a sharp pain about the region of the heart, headache, giddiness, sleepiness, and difficulty of breathing. When taken in larger doses the symptoms are most horrible, and death supervenes by syncope before effectual aid can in general be rendered.

Should unpleasant effects arise from the accidental application of cyanide to a cut finger the sufferer is recommended to apply at once an aqueous solution of chlorine to the wound, and to drink two or three grammes of the same liquid in a tumbler of water, and then to go to bed immediately, and have hot water bottles put to the feet, and along the whole length of the body. A cup of tea or coffee should then be taken, to which have been added a little laudanum, and some brandy or rum (but never *kirtch*); and this should be repeated three or four times at intervals of a quarter of an hour. Protosulphate of iron, and also ammonia, are recommended as antidotes, but are not so good as chlorine.

But it must be remembered that the action of cyanide is so extremely rapid that the delay of a minute or two, or even of a few seconds, may prove irremediable. It is advisable, therefore, that every photographer who uses cyanide for fixing his negatives, or for cleaning silver stains from his fingers, should keep in his dark room a bottle of aqueous chlorine and some laudanum, ready for use in case of an accident.

But why use cyanide at all? What is the real or supposed advantage of it? It fixes the image a little quicker, perhaps, than hypo.; and some persons suppose that the films require less thorough washing after it, but that, I fancy, is a mistake. Commercial cyanide is largely adulterated with carbonate of potash, and this being a deliquescent salt will, if it be not thoroughly removed from the film, cause it to crack after being varnished. One main cause of the cracking of varnished negatives may, I believe, be traced to the habit of fixing them with cyanide and insufficiently washing them afterwards.

As for the extra time required in fixing the negative when hypo. is used, this scarcely amounts to a practical inconvenience when the plate is put upon a dipper and immersed in a vertical bath containing a saturated solution of the salt. But what can it matter whether one's plates are fixed in thirty seconds or in one minute? And is it not folly to endanger one's health, and possibly one's life, for the sake of so small a saving of time as this must amount to? Are life and health gifts so valueless to their possessors that they are to be trifled with on so trumpery a pretence?

I have often wondered why it is that we can buy cyanide and corrosive sublimate for photographic purposes by the pound, whilst some other much weaker poisons are difficult to procure without a deal of formality.

It is so, at any rate, in France, and I believe also in England. The following anecdote will illustrate this:—

A few years ago a lady friend of mine in Jersey (now the wife of the Attorney-General of the island) asked me how she could remove some letters in marking-ink from linen. I thought at once of cyanide, but, fearing that an accident might happen through the use of it, I gave her a recipe for a different mode of proceeding. She took my formula to a chemist to have the ingredients put up, but he said he knew of a much simpler method, which would remove the marks quicker; so he wrapped up two or three lumps of a white substance like loaf sugar in a piece of paper, and she put them into her reticule. As it happened, I met her in the omnibus on her way home, and she then told me what the chemist had said, and had given to her; and that a lump was to be moistened and the mark rubbed with it, when it would instantly disappear. I looked at this wonderful stain remover, and found it to be cyanide. "And how were you going to moisten the lump?" I inquired—"with your tongue?" "Yes," she replied—"Why not?" "Simply," I said, "because you will drop down dead if you do;" which was true enough. A full explanation then followed as to the nature of these innocent-looking lumps, and the rest can be easily imagined.

Here is another little anecdote:—I once had a very small pimple upon my left wrist. It was at a time when I was using cyanide as a fixing agent, and when I did not quite believe in the danger of it, having used it for months with apparent impunity. Some of the liquid from the plate happened to touch this pimple and make it smart. I washed it at once, but it nevertheless developed into a very angry and dangerous swelling, and for a fortnight I had no sleep and suffered great agony with it. I have never used cyanide since. That one warning removed all my scepticism about its dangerous properties.

But there is another risk in having so dangerous a poison on one's premises, which, unlike other poisons, will destroy life *at once*. I remember two instances of the fatal use of it, for a suicidal purpose, which occured in Jersey; and which its presence in the laboratory, no doubt, suggested. A clever young amateur photographer—whose name I will not mention, but who was the author of a very nice little book on landscape photography—made my acquaintance, and we worked a good deal together. He was a newly-married man, and was making a heaven of earth—the happiest of the happy. Poor fellow! he lost his beautiful young wife rather suddenly. His bottle of cyanide was at hand; he knew it would kill with certainty, and without long hours of anguish and suspense, and, in a moment of delirious grief, he took the fatal draught! A doctor was at his side in less than ten minutes, but he was then lying upon the floor a corpse! The other case happened to a daughter of a photographer in St. Helier's—a young actress—under circumstances which it would be too painful to relate. A loaded pistol or a carving knife might horrify, whilst a bottle of cyanide, equally rapid and more certain in its action, might, in a moment of temporary insanity, prove a fatal snare.

Forgive me, dear reader, if I have filled a whole letter with this subject, but it *is* an important one, and I conjure you to regard it in that light. THOMAS SUTTON, B.A.

July 3, 1874.

URANIUM AS A MEANS OF CONFERRING KEEPING PROPERTIES.

To the EDITORS.

GENTLEMEN,—As many of your readers use my uranium emulsion process for dry-plate work, the following record of an experiment will be of interest to them.

You will remember that I have more than once called attention in your columns to the fact that the presence of nitrate of uranium in an emulsion gave great keeping qualities to the plates prepared therefrom, and I tested this point crucially as follows:—

In August last I was doing some work on plates 24 × 18, and having three left over I did as follows:—In connection with dry-plate preparations I have a cupboard heated to 110°, and which remains at that temperature for four days and nights in every week; during the rest of the week the cupboard is at the normal temperature of the air, and in more or less a damp atmosphere, as it is in the room where the washing of the emulsion plates is carried on. The three above-mentioned plates have remained in that cupboard untouched from August last till three days ago, and I send you a negative taken on one of them.

You will note it to be as brilliant and perfect as a negative can be, and I have been unable to find any process other than my own able to stand this prolonged high temperature and change to a damp atmosphere. All plates of other kinds tried under the same conditions by me at various times have broken down under the ordeal.

Let me, then, strongly advise those desirous of making *reliable, long-keeping*, and *highly-sensitive* dry plates to use nitrate of uranium in the emulsion; and, if they make bath plates, to use it either in the collodion or the bath.—I am, yours, &c., H. STUART WORTLEY.

July 8, 1874.

[Having examined the negative referred to by Colonel Wortley, we are able to speak in very high terms of its excellence.—EDS.]

ON THE CAUSES OF HARDNESS IN NEGATIVES.

To the EDITORS.

GENTLEMEN,—An article by Mr. Batho under the above heading in your issue of the 26th ult. touches on a matter of sufficient importance to merit a thorough discussion. The conclusion at which he arrived is, in my opinion, fallacious—that is, that the *best* work can *only* be got by a *new* bath.

The experiments detailed are inconclusive and insufficient—inconclusive, as the fault of hardness depends as much on the developer as on the bath, and even more so, presuming the lighting and exposure to be correct; and insufficient, as, presuming a bath be worked from youth to old age uncorrected, *if* an operator allow his bath to go without taking any precautions to ensure its uniform action, working it hard at the same time, there need to be no more said, and there is little doubt such an one would produce most eccentric and astonishing results. Under such conditions Mr. Batho's experiments might be considered conclusive; but, fortunately for the profession, an intelligent operator will not allow his bath to deteriorate without adopting measures to counteract the inevitable changes a hard-worked bath undergoes.

It is well known that the negative bath is at its *best* working order when it has acquired a pleasant etherial smell, and has dissolved iodides and bromides almost to saturation; consequently, then, it is *not* new. When a bath gives poor or hard negatives, generally speaking, it is because it is weak, and a little additional silver solution of double strength will remedy it, and cause it to produce as good negatives as at first.

There is a certain amount of ambiguity in the term "old bath"—"old" not generally indicating *age* at all, but merely the amount of work the bath has performed. It is quite possible that a bath made in the morning may be used up by the evening, so far as the very best work is concerned; still, on its being corrected *secundem artem*, it will work next day as well as ever it did, and, moreover, will continue to do so week after week for a long time. I will allow that in the course of time a bath will get more fit for a dose of salt than anything else. In such a case dose it and let it go, as it is labour in vain to doctor it. Possibly your correspondent will say—"That is just my argument; the bath has *gradually* deteriorated till it is useless, and after the first continually gets worse." I contend that with proper management a bath does not *gradually* get worse. It gets bad *almost at once*, and up to that time will produce the highest class of negatives with, as I have already remarked, judicious treatment.

I observe your correspondent considers the amount of alcohol required in the developer to be the index to the condition of the bath—more spirit, worse bath. For my own part, I utterly discard the use of spirit in the bath, as I consider its action most pernicious, and it is a fruitful source of a bad quality of negatives; for every drachm of spirit added a considerably worse negative is developed. The reason I assume to be this:—The salts of iron and silver are so much less soluble in spirit than in water that their action in the act of development is impeded, and, where methylated spirit is used, the resinous matter therein often contained adds still further impediments to the delicate reactions that are required to take place. If Mr. Batho will take a *new* bath, or one he considers *perfect*, and will use a series of developers containing various amounts of spirit and none at all, he will find that the developer with the largest amount of spirit gives the worst results; in fact, with sufficient spirit in the developer the best bath in existence can be made to give poor negatives, impoverished image, and loss of half-tone. With the non-spiritual developer perfect results will be obtained, and will continue to be obtained so long as the bath is properly attended to, until the salts end.—I am, yours, &c., EDWARD DUNMORE.

Llandudno, July 2, 1874.

COLLODIO-BROMIDE PLATES.

To the EDITORS.

GENTLEMEN,—I was on the very point of starting for Ireland—whence I am just returned—when I penned my hasty letter respecting plates without washing; and I hasten to apologise to Mr. Sutton, than whom a kinder or less offensive critic there cannot be, if I appeared to include him as having overlooked my previous letters on that subject. In fact, what I intended rather to refer to was not so much that particular incident as the general disregard which different writers seem to pay to the formulæ of those who present to the public what they positively assert to be thoroughly rapid, dense, and good plates. I refer more especially to Colonel Stuart Wortley's progressive issues.

Colonel Wortley's original improvement on Mr. M. Carey Lea's formula, by a large excess of silver in the emulsion, gave very rapid plates; but there was a little difficulty in intensifying them, owing, I believe, to the use of nitric, instead of hydrochloric, acid. The addition of uranium increased the density and very greatly enhanced the keeping properties of the emulsion. In fact, these plates, when the smallest quantity of hydrochloric acid which prevented fogging was used, have long been sent out by the Uranium Dry Plate Company of the very finest quality. Latterly Colonel Wortley has sent me and others some plates, containing an organic element, which are certainly as rapid as wet plates, and develope with as great density by the first application of the ammoniacal solution as can be wished. Should this addition continue to commend itself I have not the least doubt Colonel Wortley will publish it, as he has already published his formulæ both for the emulsion and preservative which he uses.

In my last letter I stated that I was perfectly content with Colonel Wortley's original emulsion, with the sole alteration in the acid employed. From patient experience I am quite sure that an emulsion containing eight grains of bromide of cadmium, sixteen grains of nitrate of silver, and one or (if necessary) two drops of hydrochloric acid to the ounce, leaves little to be desired. The best preservative for this emulsion I believe to be either Colonel Wortley's published formula or mine, viz., bright table beer, one ounce; pyrogallic acid, two grains. Both contain what I think essential—a strong dose of gallic or pyrogallic acid.

I see that Mr. Stillman is experimenting on behalf of the Liverpool Dry-Plate Company, and I feel sure he will approach continually to the above emulsion, and will cease to rely on tannin alone as a preservative. Table beer *alone*, which contains tannin, albumen, and sugar, is a good preservative as regards keeping; but without pyrogallic acid the plates require three or four times the exposure, and are more difficult to intensify. Whether the plates are best washed first and put into the preservative afterwards, or *vice versâ*, I am not quite sure; I believe them to be more rapid if put first into the preservative and just rinsed after. My doubt is as to the keeping properties, which I have not yet sufficiently proved. Let me now add that my experience at Killarney has quite confirmed my confidence, nearly every negative having proved clear, dense, and very full of detail—in fact, very like wet-plate negatives.

Either, therefore, other photographers who, like Mr. M. Carey Lea, Mr. Sutton, and Mr. Stillman, must be very superior to myself, have not given Colonel Wortley's plates and proportions a fair trial, or else, I think, they would not be always proposing some new ingredient to which they attribute more or less success in accomplishing the same result, which presupposes that it has not already been attained. But, inasmuch as, no doubt, failures now and then do occur, I should much like, if you can spare me the space, to state how and why it sometimes is so.

1. I am quite sure the pyroxyline is of the greatest importance, and is the most fruitful source of variation in the performance of the same emulsion. In my late trip I used three different batches of plates, all made by Colonel Wortley's formula, but one batch was made with collodion, fresh from a celebrated firm. All the plates looked exactly alike, but when I came to develope them the films of the latter ones at once shrivelled up under the ammonia, so that no strength of albumen on the glass could hold them. Of course, as soon as I found this out, I varnished the plates round the edges. Still, though so held, the films were perfectly loose elsewhere, and, however carefully washed and stretched, never presented the same clear appearance as the others, and to my great horror, when dried, they split up in all directions like the ashes of burnt bank notes, and so were lost. As this has happened to me before, and may happen to others, I beg to give you a remedy for this *extreme* result, which I have never seen mentioned, but which I have found specific. After the plate is carefully but thoroughly washed allow a little pretty strong mixture of albumen and water to flow over it, and it will dry with perfect adherence to the plate. The pyroxyline should always be of the *powdery* character. Can this be always ensured? I wish it could!

2. Exposure makes a very great difference in the development and ultimate appearance of these plates. Wide-angle lenses are particularly deceitful as regards exposure. Not only are small stops necessary, but the two edges of the plates receive so very much less light than the centre that under-exposure, even with the most rapid plates, is very dangerous. In that case it is wonderful what detail you can force out in these plates without fogging; but a *forced* plate never presents the same appearance as one with sufficient exposure. It assumes a bluish, inky tone, and prints flat. On the other hand, an over-exposed plate is always thin and must be intensified. The less it is forced for density the better. As soon as ever the detail is out wash it, and intensify with silver. Beautiful negatives may be so obtained, and with these negatives any intensity, with just a single wash of pyro. and silver. But with a right exposure (always a short one where the light is good) these plates develope so like a wet plate that it is beautiful to watch them. The sky comes out at once, and continually intensifies as detail after detail appears. The plate keeps its colour and brightness all the while, and needs nothing but the hypo. and good washing to be perfect. Good plates may, therefore, be often blamed where exposure and development only are at fault; and *right* exposure, under all the various conditions of light and shade, requires very great experience indeed.

3. I fear formulæ are often blamed for the too frequent variation discovered by the purchasers of commercial dry plates. It is several years since I used the Liverpool plates, which were then the best in the market, and are still very good; but I never got two batches alike—very great difference in sensitiveness, in chalkiness, in colour, and general result being *always* apparent. The fact is that, in such a delicate chemical process, a very little difference in any of the materials or in the time of washing or leaving in the preservative, or even in the manipulation by the various *employés* for the mechanical operations, will easily cause considerable difference in the resulting plate.

What I wish, therefore, to impress upon your readers is that if we are satisfied that with good materials, accurate proportions, and careful manipulation a certain formula gives first-rate results, we ought not to be always looking about for the addition of some fresh nostrum or different proportions to remedy failures which are due to other causes.

Forgive so long a letter, and if I can find time and you space next week I will endeavour to give you my experience and ideas respecting exposure, blurring, halation, and other practical difficulties during a photographic tour, *especially at Killarney!*—I am, yours, &c.,

Hilgay Rectory, July 6, 1874. ST. VINCENT BEECHEY.

WASTES.

To the EDITORS.

GENTLEMEN,—Your "Peripatetic" correspondent has done me an honour which I hasten to inform him does not belong to me, for I would scorn the idea of borrowed plumes, even if made of *collodio-chloride*. I am *not* a Welshman, which no doubt accounts for my lack of wisdom concerning photographic wastes; still, with the little wisdom I do possess, I have ascertained that we have no guarantee that we receive full value for our wastes, even if we wait while they are reduced.

I need not state where I have obtained my information on the subject, but "I could a tale unfold," which if it did not make the hair of our friend stand on end would at least surprise him; but I forbear, lest I should bring the professional refiners about my poor devoted head.

I should esteem it a very great favour (and doubtless your numerous readers would be equally thankful) if our "Peripatetic" friend would kindly give us full instructions how to perform the "*joke*" of reducing our wastes in the simple, certain manner he suggests, and so give us an opportunity to compare our results with those given us by the professional refiners.—I am, yours, &c. THOMAS FORREST.

Pontypridd, July 7, 1874.

THE APPROACHING TRANSIT OF VENUS.—The following communication, from Mr. Richard A. Proctor, has appeared in some of the London daily papers:—"I have been asked to make as widely public as possible a suggestion respecting the approaching transit which, if adopted, would enable some of our skilful astronomical amateurs to do their part towards utilising that important phenomenon. The suggestion is that the middle and latter half of the transit should be observed and photographed at some station in Natal or Cape Colony. Such provision as circumstances admit of has now been made for observing and photographing (1) the beginning and end of the transit severally, and (2) the whole transit. But the middle of the transit, which theoretically is the most important phase of all (because at this stage the planet's apparent distance from the sun's centre changes very slowly, so that a small time-error is unimportant), has been unaccountably neglected. So far as northern stations are concerned (where Venus will be thrown nearer to the sun's rays), the Halleyan stations, nearly a score in number, will show mid-transit excellently; but it chances that the southern Halleyan stations (where Venus will be thrown farther from the sun's centre) are not so favourable for mid-transit as Cape Town, Port Natal, and South Madagascar, where the latter half of the transit is alone favourably seen. Under these circumstances, and because southern stations are unfortunately few in number (owing to geographical difficulties), it would be a matter of great importance, and might be a matter of paramount importance, if one or more of the suggested mid-transit stations could be occupied for direct and photographic observations. I must explain that the suggestion above advanced came originally from Mr. E. L. Garbett, an ingenious and skilful mathematician, and that it is in no way connected with the controversy of last year, now brought to a close with results which cannot but be as satisfactory to the lover of science as they are creditable to our official astronomers. If the suggestion is to be adopted preparations ought at once to be made for organising the expedition and subscribing a suitable sum to meet expenses. As several letters have reached me since I first mentioned the matter inviting me to undertake the task of organisation, I beg to take this opportunity of explaining that it is quite out of my power to do so, and that I am too busy to join any expedition, though I should be heartily glad to subscribe my share towards providing for the suggested scheme."

EXCHANGE COLUMN.

A quarter-plate camera and lens offered in exchange for a fern case.—Address, T. S. B., 42, Leighton-lane, Leeds.

A lady's silver Geneva watch, nearly new, is offered in exchange for a half-plate bellows camera.—Address, W. H. PAGE, 3, High-street, Wainfleet.

A whole-plate camera and triplet lens, by Vogel, all in good condition, will be exchanged for a good *carte* camera and lens, by any good maker, to take standing *cartes* in fourteen feet from sitter.—Address, PHOTO., Caxton Buildings, Wrexham, Wales.

Wanted, a good *carte* lens (Dallmeyer's or Ross's preferred), to work within fourteen to fifteen feet from sitter; also a fancy background (exterior), for which any of the following are offered:—Dallmeyer's new instantaneous stereo. lens, dark tent conveniently fitted, fancy background, camera $7\frac{1}{2} \times 4\frac{1}{2}$, with double dark slide, and other articles.—Address, ARTIST, 5, Crescent-place, Plymouth.

ANSWERS TO CORRESPONDENTS.

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

*** At the last moment we have been compelled to leave over till next week the report of the last meeting of the Photographic Society of France.

S. T.—Full directions will be found in our ALMANAC for last year.

MARY B.—The address of M. Hermagis is 18, Rue Rambuteau, Paris.

J. B. (Worcester).—The advertisement is not admissible in its present form.

CYANIDINE.—You ought to apply to an analytical chemist, enclosing to him a fee of two guineas.

M. N.—Do not waste any more time in trying to get your bath into working order, but at once throw down the silver and sell it to a refiner.

R.—Mr. Solomon, of Red Lion-square, is the sole agent. Full particulars will be found in his catalogue, which you can obtain upon application.

E. C. P.—We have never heard of the special means of inverting the image alluded to by you. Some use for this purpose a mirror inclined at an angle of forty-five degrees. We shall be glad to know more about it.

TROUBLED (Manchester).—We have before this heard of a refractory printing bath similar to yours. It was cured by adding a weak solution of bicarbonate of soda until it remained permanently turbid. It should then be filtered, and acidulated by one or two drops of nitric acid.

C. JARDINE.—The spots in the enlargement are not caused by any defect in the paper itself, but by the chemicals. The use of distilled water, together with careful filtration, will obviate such defects. To prevent the fogging so apparent in the print of the girl increase the proportion of acetic acid in the sensitising bath.

Q. C.—The first thing to be done is to effect the removal of the bad varnish with which the negatives are at present coated. This may be done either by placing them in a bath of alcohol until the varnish dissolves, or by pouring over the surface, two or three times, a solution of caustic potash in water, about two ounces to the pint. Two ounces of alcohol should also be added to the solution. This mixture forms a most energetic solvent of a film of varnish.

REV. J. R.—The following method of obtaining oxygen was at one time adopted on a large scale on the continent; but in this country, we imagine, more as a curiosity than a ready means by which to obtain the gas. It is, however, much better than the method you have suggested. It is effected in this manner:—Pass a current of air through a solution of permanganate of potash, which will absorb the oxygen; when saturation has been effected the oxygen is expelled by hot vapour.

BEGINNER.—The Fothergill process is carried out by washing the plate very slightly upon its removal from the silver bath, then applying diluted alkaline albumen, and finally washing off all the albumen not entangled in the pores of the collodion. The proportions for the albumen are—the white of one egg, three ounces of water, and ten drops of ammonia. They are beaten up to a froth, and, after being allowed to repose and become liquefied, the solution is ready for immediate use, or will keep for several months.

J. T. HAILES.—We think that the streaks of which you complain will disappear by giving a lateral motion to the plate immediately after immersing it. We should advise you to remove the bath in the evening from the hot dark room to the coolest part of the house. It is a good plan, when the weather is very hot, to place the bath in a tin case in which a few lumps of ice are kept. The bath may also be kept cool by encasing it in a tightly-fitting jacket of flannel, which must be kept wet. This, however, only answers when the atmosphere is dry and the evaporation rapid.

WESTON'S ROTARY BURNISHER.—Writing on the subject of the scratching of prints alleged to have been caused by the use of this burnisher, Mr. John J. Atkinson, of Liverpool, informs us, and supports the information by enclosing for our perusal a number of corroborative letters, that these complaints have only been made by those who have not used the machine in the manner found by experience to be correct. Several of those who spoke hastily against it have now recalled their hostile expressions, and from what we can learn the burnisher has a successful future before it.

COLLODIO-CHLORIDE.—Dr. Thompson sends us a letter on this subject, from which we content ourselves with the following extract:—"The editor of the *News* is true to himself, and neatly ignores his rebuff; but I must yet further 'roast' him, I fear, if he do not learn to be a little more choice in his epithets. He possesses to perfection the faculty of assumption, and has not only assumed an alphabet of *aliases* to defend an assumed discovery of no practical value, but he presumes to assume that all who differ from him are rogues and coarse creatures, and that, in consequence, I am so. To crown all, he assumes that I am an imposter for asserting that my degree is American, because in any case I must be registered before I can practise here. Quite true, O! most assumptive of editors! But I never said that I did practise in this country; therefore these vulgar insinuations fall harmless. May I not well ask, in conclusion, could the force of impudent assertion and assumption further go?"

GEO. WARD.—The stains will disappear if the plate, after removal from the silver bath, be rinsed in a little distilled water.

GO-AHEAD.—It is our intention shortly to devote an article to a description of the press, with especial reference to its application to photography and photographers. In the meantime, we cannot insert your letter, as we labour under the slight disadvantage of having neither tried or even seen one of the kind you mention, and scarcely know to what extent it will fulfil what you anticipate from it. The production of printing surfaces of various kinds by means of photography is so far from being difficult that any intelligent person could, after a few trials, produce a surface which, in the hands of anyone possessing a small press and the ability to work it, would yield very creditable results.

PHOTOLITHO.—Mr. Griggs is undoubtedly right in his strong advocacy of a prism for producing reversed negatives; but a prism is superior to a mirror only when the glass of which it is composed is quite faultless. Any veins or striæ are fatal to its perfection; and freedom from these, as well as absolute homogeneity, can only be secured at an enormous cost when the prism is of large dimensions. A well-silvered mirror costs only a mere trifle, and is far better than a prism in which there exists striæ of even a slightly-pronounced character. We possess a small rectangular or reversing prism which, to a casual observer, appears free from blemish; but it is impossible to obtain by its assistance a copy of an engraving in which the finest lines are well delineated. On the other hand, when using a mirror silvered by the directions given by Mr. Burton in a recent ALMANAC, and with the same lens, the fine lines of the engraving are well represented.

RECEIVED.—W. J. Stillman; G. Watmough Webster, F.C.S.; W. E. Batho. In our next.

ROYAL PATRONAGE IN ENAMELLING.—Her Majesty, who is said to be quite a connoisseur in enamels, on Friday last commanded the attendance of Mr. A. L. Henderson, and gave him a commission to execute by his photo-enamel process some photographs from negatives in her possession, prints from which had been obtained on paper but had not proved permanent. Her Majesty already possessed a large collection of Mr. Henderson's enamels.

THE TRANSIT OF VENUS.—Captain W. de W. Abney, R.E., writes to us (*The Times*) from St. Margaret's, Rochester:—"In your notice of the preparations made for the Transit of Venus Expedition you have correctly announced that a dry-plate process worked out by myself has been adopted. I should like to add that with a slight modification the method of development which will be employed is that introduced by Colonel Stuart Wortley, viz., the use of the strong alkaline developer. As to the Colonel belongs the secret of putting into the hands of photographers the powerful aid to rapidity with dry plates, I should be glad if you would insert this letter. I find my process is rather more rapid than wet plates when using it, while with the ordinary development it is but little more than half as quick."——*The Times* has subsequently admitted that there was a misprint in using the word "secret." It should have been "*credit*," thus reading—"As to the Colonel belongs the *credit*," &c. There is no "secret" in connection with Colonel Wortley's strong alkaline developer, for he has freely published all that he knows.

LONDON GAZETTE, *Friday, July* 3, 1874.

PARTNERSHIPS DISSOLVED.

SIMS AND BERTIN, Tunbridge Wells, photographers.

Tuesday, July 7.

ROBINSON AND THOMPSON, Liverpool and Birkenhead, photographic artists.

METEOROLOGICAL REPORT,

For two Weeks ending July 8, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
25	29·81	W	55	59	71	49	Cloudy
26	29·66	SE	55	58	61	51	Cloudy
27	29·63	E	56	59	70	51	Dull
29	29·97	W	56	60	71	49	Fine
30	30·04	W	59	64	72	54	Fine
July.							
1	30·05	W	60	62	71	57	Raining
2	29·94	SW	65	70	85	54	Dull
3	30·00	W	59	64	75	56	Fine
4	30·09	W	58	63	72	53	Fine
6	30·28	E	54	61	72	51	Fine
7	30·17	SE	56	62	77	50	Fine
8	30·15	E	59	65	—	51	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 741. Vol. XXI.—JULY 17, 1874.

THE LATEST ADVANCE IN DRY-PLATE PHOTOGRAPHY.

Complaints have very frequently been made by photographers having occasion to take sensitive dry plates with them to the continent that, owing to the thoughtlessanes, the ignorance, or perhaps even the malice, of foreign custom-house officials their plate-boxes have been opened in the light and the plates spoilt in consequence. In order to avert this danger various directions have from time to time been published in this Journal at the commencement of the tourists' photographic season, and plain intimations have been printed in several continental languages informing the officials at the custom-house that the box to which the label is attached contains nothing but sensitised glass plates prepared for photographic purposes, and which are liable to destruction by even a momentary exposure to light. Panes of red glass have also been inserted in the ends of the plate-boxes so as to permit of the contents being seen without opening the box.

But dry-plate landscape photographers are now fast falling—if indeed they have not already fallen—upon halcyon days. Such has been the progress recently made in this department of our art-science that a photographic tourist may now set out on his travels without any plates at all, either prepared or unprepared. His camera and stand, an empty plate-box in which to bring home his negatives, a packet or a concentrated alcoholic solution of pyrogallic acid, as much ammonia and bromide as may be contained in an ounce vial, together with a bottle of sensitive collodion emulsion—these are all that are required to form the outfit of the nomadic photographer.

We received from Mr. Stillman, a few weeks since, a bottle containing sensitive collodion which was ready for exposure in the camera as soon as it had been poured upon glass and allowed to become dry. After making a few trials of it we were irresistibly forced to the conclusion that in a preparation of this kind lay the future of easy-going, dry-plate photography for the tourist. Keeping always ready for use for an indefinite period, requiring only to be poured out on a plate of glass to render the latter fit for use in the camera without any washing or preservative, and, further, keeping good after it has been converted into a film upon the glass, and this both before and after exposure—why should not a photographic tourist avail himself to the fullest extent of this kind of "photography made easy?"

With a possible view to the utilising of this new system of photographic practice during the forthcoming meeting of the British Association we have gone through the whole curriculum, and beg the reader's attention while we relate what we did, merely premising that, while our experiment was conducted by Stillman's collodion, which is now an article of commerce, the preparation of collodion possessing similar properties has been, thanks to Mr. Bolton and others, minutely described in these pages. A commercial article, therefore, is not a *sine quâ non*.

The preparation of these plates was conducted under circumstances as nearly as possible identical with those we would have to encounter at a hotel or other temporary abode. Half-a-dozen lean plates of glass were placed on the dining-room table in a little folding rack. The gas was turned down, a lighted candle being used instead, and a sheet of yellow paper placed in front of the flame. The collodion bottle was removed from its yellow paper wrappings, and plate after plate was rapidly coated, each plate being returned to its place on the rack when finished; and such was the rapidity with which the entire operation was effected that the stopper was not replaced in the bottle until the sixth plate was placed in its groove. The plates were now fully prepared; but we deemed it better to allow them to remain in the rack for fifteen or twenty minutes in order to allow the film to harden before placing them in the dark slides. One of these plates was exposed the following morning, and developed ten hours afterwards. Two others were exposed the morning after that, one of which was developed immediately, the other being allowed to remain undeveloped for two days. Others have been exposed, but have not yet been developed, nor will they be until they have remained one and two weeks respectively in the slides. The negatives obtained under these circumstances are really excellent.

The development is effected by first wetting the surface with alcohol and then washing with water. A three- or four-grain solution of pyrogallic acid is now applied, and allowed to remain on for about a minute, by which time it usually happens that the image will be very faintly seen. The pyro. solution is now poured off into a vessel containing a very small quantity of greatly-diluted ammonia and bromide of cadmium, and the whole again applied to the plate, when the image will be seen to gain in vigour with great rapidity.

The following proportions are recommended to those who try the development of plates prepared in the manner described:—Dilute one drachm of strong ammonia with thirteen drachms of water, which put into one bottle; into a second bottle put five grains of bromide of cadmium and an ounce of water; and in a working stock bottle place equal quantities of the previous two solutions. For each drachm of pyrogallic solution employed in developing a plate add six drops of the mixture from the working stock bottle, and increase or diminish this proportion should it be found necessary. For example: if the subject be a flat, tame one, to which it is desirable that greater vigour should be imparted, add a drop or two more of the bromide solution alone; but add no ammonia, except that which is mixed with the bromide, otherwise veiling of the image may result. To use ammonia solution without the addition of bromide *ab initio* will ensure fogging. This has certainly been our experience.

GELATINE.

In a late number we devoted some space to the subject of permanent photography, and endeavoured to impress upon the readers of this Journal the very evident importance of this branch of their art, and also the importance of a cultivation of carbon printing—shall we say gelatine printing? Gelatine in this respect bears in such process a somewhat similar position towards us that collodion does, but at the same time a rather higher function. It may not only act as the colloid-carrier of the chemicals used in the process and the surface-former, but it takes part itself in the chemical method by which we get our picture. Its chemical properties and tests are, therefore, of vital importance to the photographer, and it is with this view that the following article has been penned.

Gelatine is a colloid, and in this respect very nearly resembles the etherial solution of pyroxyline itself. By a "colloid" is understood the very opposite of a "crystalloid," or crystalline substance. It is a term which was first used by the late Professor Graham to express a class of substances having the characteristics of glue, both as regards their physical appearance and, we might say, their physico-chemical reactions. Thus sugar is a crystalloid and very amenable to the laws of diffusion. Albumen is not, and therefore is not so easily diffused. A colloid in certain conditions appears in the nature of a jelly; when it is dried it forms gum-like masses devoid of crystalline structure. A substance may, under certain circumstances, present both the characteristics of a crystalline substance and a colloid. The gelatinous condition of silica is so well marked that physically it could hardly be distinguished from gelatine, yet it also frequently assumes the crystalline condition. Graham has very minutely described the two conditions of silica, and points out that dilution gradually weakens the colloidal character of all substances, and may allow their crystalline character to gain ground. It is surprising that the colloid solutions of silicic acid have not found any applications as yet in photography. But to resume our subject.

The chemistry of gelatine we may dispose of in a few words. It has a centesimal composition as follows:—

Carbon	50·00
Hydrogen	6·41
Oxygen	25·64
Nitrogen	17·95
	100·

When pure it is perfectly colourless, odourless, and transparent. If it disagree in these particulars—or rather, we would say, the further an individual sample is from these characteristics—the more impure is the said sample. In the dry state it is elastic, vitreous, hard, and brittle, resembling glass in its physical condition. When hydrated it assumes the well-known jelly appearance so familiar in our culinary jelly. The vitreous and colloid nature of both glass and gelatine has been very strikingly pointed out by Professor Graham, who showed that if pure gelatine be dried in a glass vessel very slowly—let us say over sulphuric acid—the adhesion is so great that the anhydrous gelatine, in contracting, tears up the surface of the glass vessel.

Gelatine swells in cold water, but should not dissolve. After standing in cold water, however, for some time it absorbs forty per cent. of water, and swells considerably in bulk. It dissolves perfectly on heating, and is reprecipitated again upon cooling; but this time in a perfectly jelly-like condition.

Now there are two varieties of gelatine that engage the attention of the photographer—the natural gelatines, which consist of the swimming bladders of fish (so-called "isinglasses") and the patent gelatine procured from bones and other animal tissues, which is sometimes considered or viewed in the light of a decomposition produced from a substance called "ossein." The ossein contains 49·2 per cent. of carbon, 7·8 of hydrogen, 17·9 of nitrogen, and a little sulphur. It is converted into gelatine by boiling, and the presence of an acid greatly facilitates this change. The distinct varieties of isinglass are numerous, and really do not differ much in quality, although they may do so in colour.

The various kinds of isinglass are named after the localities where they are prepared. Thus Astrakhan, Samovey, and Kroski are the Russian varieties of isinglass, and are considered to be the finest. Brazilian, New York, and Hudson's Bay are inferior descriptions—particularly the New York, which is very impure, and gives a very dark-coloured solution. It is not nearly so soluble as the other varieties. The terms "leaf," "long staple" and "short staple," "honeycomb," and "book" isinglass merely refer to the mode in which the swimming bladder is prepared, or, rather, we should say, the shape in which it is sent into the market, and has nothing to do with its quality. The finest isinglass, however, is that known as 'Astrakhan leaf," which is obtained from sturgeons.

Isinglasses may be said to be unprepared as regards any chemical process. The process is, in fact, simply a matter of cleaning from parts which are supposed to contain no gelatine—such as the membrane. Sometimes it is, however, artificially bleached. For photographic purposes isinglass may be looked upon almost as pure gelatine; but, at the same time, it will be found that it contains a very considerable bulk of insoluble membrane, which can, however, be easily separated by filtering or straining. It also contains traces of albumen, salts of potash and soda, and phosphate of lime. It contains ninety-eight per cent. of absolute gelatine if it be of the best quality.

We now come to the patent and prepared gelatines, which, although they give a very bright solution, are frequently very impure. There are numerous methods by which the dirty and impure gelatines are purified; but they all hinge upon the application of sulphurous acid, which acts in a twofold capacity—it retards decomposition of the gelatine during the process of purification, and helps to bleach it. From this cause almost every sample of gelatine will be found to give a precipitate with chloride of barium, owing to the presence of sulphates. If animal charcoal be used to decolourise the gelatine it will frequently be found that it gives a marked precipitate with nitrate of silver, owing to the presence of chlorides. Gelatine can, however, be very easily purified from soluble salts by the laws of diffusion. This fact has been already pointed out in the pages of this Journal, and it should be borne in mind that there is not the slightest occasion or necessity to use a dialyser in its purification. The gelatine must not be in large pieces, and if it can be got into a suitable state of mechanical division all that is necessary is that it should be placed in a *stream of pure water*. It will act as its own dialyser, and all soluble crystalloidal impurities will pass away.

Hardly two samples of gelatine seem to agree as regards their actual solubility and the temperature necessary to render them liquid. This remark applies similarly to the natural gelatine. A well-known firm issues two qualities of prepared gelatine. No. 1 is comparatively soluble and rather opaque in appearance. No. 2 is bright-looking and hard, and is more suitable for printing-work.

Isinglasses, although very pure gelatines, are not much used by photographers. They require some preparation before use, and are therefore not much in favour with practical men. But at some future day we intend publishing some practical experiments, undertaken with a special view to the photographic aspect of this substance. The probabilities are greatly in favour of gelatine superseding collodion in the practice of photography, even in the production of silver negatives.

IMPROVEMENTS IN ARTIFICIAL LIGHTING.

In our number for May 8th of the present year, when describing certain improvements made by Mr. A. M. Silber in lamps for consuming oil, we spoke of certain other improvements, equally important, which he had made in effecting the perfect combustion of common gas, and of which we promised to give details at a subsequent period.

On Saturday last we, with a party of scientific men and members of the press, were invited to be present at a trial of certain improved methods of gas-lighting, resulting—as Mr. Silber was careful in informing his audience—not from the discovery or application of any new principle, but merely from the more perfect method he had applied to principles long previously known.

Those who examine the flame of an ordinary argand gas burner will not fail to notice how thin, blue, and poor in illuminating power is the flame in the vicinity of the burner. The percentage of loss from this imperfect consumption of the gas is considerable. Another feature in the aspect of the flame from an argand burner is that even the most luminous portion of the cylinder of light is somewhat defective in respect of purity of colour as well as lacking in intensity.

As gas-burners of this description have hitherto been constructed, the current of air passing upward through the centre has been allowed to take its own course and to act in an uncontrolled manner upon the flame. The first step taken by Mr. Silber was to place this central ascending current of air under such control that it should do just what *he* required of it—neither more nor less. This end Mr. Silber has attained by the introduction of a small tube placed in the centre of, and concentrically with, the burner. Simple-looking though this tube be, it is evidently proportioned with much care and after numerous experiments. The really interesting matter to know in connection with it is that by its agency the inner air-draughts are so regulated and adjusted to each portion of the flame that, by the gentle current directed against the lower or blue portion, it becomes luminous, while another current comes into contact with the upper portion without being vitiated by having played against the bottom of the igneous cylinder. The result of this regulation of the current is that the flame is rendered more luminous throughout its entire bulk, and that the previous yellow colour is superseded by one much whiter.

The real value of the gain secured by the central regulating tube just described was strikingly illustrated by having one of the burners exhibited in action so constructed as to render the removal or subsequent application of this tube a matter which could be effected by any person in a moment, and without scarcely disturbing the flame. When the tube was withdrawn the flame was thin, poor, and somewhat flickering; no sooner, however, was it dropped into its place than the flame became altered in character. The whole secret of success lies in admitting precisely as much air to the flame as the requirements of perfect combustion demand, and in distributing the air to the several parts of the flame in the exact proportions needed.

What has been said refers to the single argand burner; but the principle so ably carried out in the manner just described has been extended to the production of large concentric ring burners—one of which, giving a light equal to a thousand candles, was on the table. One of these burners was recently tested at the Drapers' Hall, when it was found that, with a consumption of eighty-six cubic feet of gas per hour, it gave much more perfect illumination than seventy-five fishtail burners consuming three hundred feet during the same time.

With a light so intense and pure, the question arises how far it may not contribute to solving the problem of a cheap and practical method of photographing by artificial light; for, with a battery of six of these thousand-candle-power burners, *properly arranged*, a light of considerable intensity could be made to fall upon a sitter under circumstances much more conducive to softness and freedom from harsh shadows than is the case when either the electric or magnesium light is employed. It is our intention to prepare some plates with a highly-bromised collodion, and thus ascertain the value for the purpose indicated of this powerful concentric burner of Mr. Silber's, after which we shall again revert to the subject.

We conclude at present by observing that, at the termination of the demonstration by Mr. Silber to which we have referred, Lord William Hay, Dr. Mann, and others expressed their sense of the importance and value of the improvements practically introduced by Mr. Silber.

We beg to remind our readers that the meeting of the British Association is to be held this year at Belfast, the opening meeting taking place on the evening of Wednesday, the 19th proximo, on which occasion Dr. Tyndall, F.R.S., the President elect, is to deliver the inaugural address. The meetings will terminate on the following Wednesday. The sister isle can boast of several amateur and professional photographers of great scientific and artistic reputation; and it is to be hoped that the amateur class of photographers will make its presence known at the sectional meetings, as some of the professional class will doubtless do at the *soirées*, at which a photographic exhibition of the scenery for which Ireland is so famous would be much appreciated by the numerous visitors from this portion of the United Kingdom.

PHANTOM IMAGES.

Many readers of The British Journal of Photography of July 10, whose attention was called to Mr. W. Harding Warner's account of a peculiar appearance seen on two negatives taken in a church by him, will have been puzzled to account for its cause, though believers in spiritualism would experience no difficulty—indeed, would see in it another phase of the visible presentment to a favoured one of things impalpable to the unprivileged masses. Fortunately, the rigid laws of optics are quite sufficient to explain the phenomenon without recourse to the immaterial, superhuman influences so complacently assumed by Mr. Warner's American friend.

The merest tyro in optics is aware that glass and all transparent substances reflect some part (greater or less according to the angle of incidence) of all rays of light other than perpendicular which strike upon their polished surfaces, and the lenses used in photography form no exception to the rule. Anyone looking into a camera, his eye in the place of the ground glass, will notice a number of images, all produced from the various reflecting surfaces of the lens. Mr. Warner's phantom, I expect, was produced by the reflection of the image from the anterior surface of the back lens, returned to the front, and reflected again from its posterior surface in such a manner that the back lens received it and brought it almost to a real focus on the sensitive plate. When Mr. Warner used a single combination these conditions did obtain, and the phantom was laid.

I experienced a similar annoyance myself last spring in taking a photograph of a tomb late in the evening, the sun shining through some trees directly into the camera. Right in the middle of the little piece of sward in front of the stone there appeared, in developing the negative, an annoying blurred effect on the grass. Thinking this was owing to the wind having blown about some spray on the wreath and cross of flowers with which the grave was decorated, I took another negative, which had a similar defect, but a little more to one side than in the first. It was too late to take another negative, so I perforce had to be content with one of these blurred ones. On examining the negatives very carefully when I reached home I noticed on an adjoining tombstone, in the margin of the picture, a plain representation of the boughs of the trees in front of me, through which the sun was shining, and which were *on the other side of the stone*—that is, the stone was between the trees and the camera. The explanation above given satisfactorily accounts for this appearance.

It may be asked—Why is not such an effect oftener seen? The reply is that this ghost image is so faint in comparison with the image the same object would project under ordinary circumstances that it is entirely obliterated or, rather, overwhelmed by the other objects in the picture, in the same way that passing figures in a long-exposed view do not leave any trace on the plate, though their images must have been impressed.

I will now advert to another phantom which once gave me some trouble. I was making a negative from a transparency, when over the lower half of the plate was seen a decided and tolerably well-focussed series of bands—a broad opaque band and a transparent white one. On a second plate appeared the same effect exactly. A close examination showed that it was a representation of my studio windows. How was this to be accounted for, seeing that the lens was shielded from all light except what passed through the transparency? I found that the screw of the rising front of the camera was by accident left out, and the small hole which when *in situ* it would have stopped up was open to the light, and had acted as a lens and depicted upon the plate an image of the sky, broken by the window-bars, so strong as to obliterate all else. We all know that a small aperture of any shape will act as a lens.

Two other phantoms may be mentioned, though their explanation is simple enough. I was working with a new camera. The first negative I took required the sliding front to be raised; the next negative, without the front being raised, was all fogged in a patch of some regularity of form towards the middle of the lower half of the plate. An inspection showed me that when the front was not raised the screw did not fill up the hole entirely, and so, as in the preceding case, the sky was projected on to my plate.

A fourth and last phantom was a slightly crescent-shaped opaque patch, evidently caused by a violent action of light, near the top of the plate. The cause of this I deduced was the sun having struck the edge of the diaphragm, which, though black, was necessarily polished, and threw off an immense quantity of light. The exposure was a long one, and the sun was almost overhead, the object being in a yard sheltered by high walls. My assistant was left in charge, shielding the lens with his hat, and for a while must have neglected his duty. Moral: have a sunshade to all your lenses.

G. Watmough Webster, F.C.S.

ON THE COMPARISON OF PHOTOGRAPHIC PROCESSES WITH REFERENCE TO THEIR RELATIVE RAPIDITY.

To compare the relative rapidity of photographic processes—to determine, for instance, which of any two is the more rapid, and by how much its rapidity exceeds that of the other—seems to be a matter of small difficulty. I have recently had occasion to demonstrate this difference in the instance of two processes in which one has a very material advantage over the other, and have found with surprise that considerable misapprehension on the matter prevails, both as to the kind of experiment suited to the determination of the point in question, and even as to the value of a crucial test. This misapprehension is, no doubt, the cause of such a total variance in the statements of various experimentalists who have from time to time made comparison of certain photographic processes. I take the liberty, therefore, of making a few remarks on a matter which every photographer should understand.

It is well known to those accustomed to operating in the tropics that the exposure required in landscape work under a cloudless sky and in a dry atmosphere is greater than under the cloudy and moist atmosphere of England. It is also well known that this increased exposure results from the very dark shadows cast by objects under a sky which has no clouds to illumine the detail in the shade. Over and over again it has been laid down as an axiom in exposure that time enough must be given to bring out the detail of the shades. "Look to your shadows, and let your lights take care of themselves," is an expression which may be regarded as a photographic proverb.

The way to compare scientifically the relative rapidity of processes in photography is to expose to an object of uniform and invariable illumination for times sufficient to get an uniform and determinable effect. The relative rapidity is then directly as the relative exposure. Practically, we find visibility to be the only definite effect we can look for in a negative, intensity being influenced by so many causes that it can count for nothing. We may, then, in testing two processes with a view to determine which is the more sensitive, and by how much, adopt one of these two methods:—We may use a white screen or sheet of paper illuminated uniformly and in a constant light, expose in the camera in each case for a length of time short enough to give on development a faint image only, and coming out with reluctance; or we may use a number of objects, varying but little in illumination and light-reflecting power, all in the shade, and expose in each instance for the minimum of time requisite to bring out the details of this shadow picture. In either case, the rapidity of the processes compared varies directly as the times required to produce the constant and comparable result. A head lighted as for ordinary portraiture, though sufficing well enough to distinguish qualitatively which of two processes is the more sensitive, is wholly misleading when employed for obtaining quantitative results. The amount of dark shadow is so small that very little difference is perceived in negatives taken by the same process with exposures varying considerably, and the more especially if one be over-exposed. Take a sheet of cardboard, divide it into one hundred squares, and paint one almost black or quite so, and write on it with lead pencil. Suppose, now, an exposure of one minute were required to show the detail in this black square. Take a negative so exposed and compare with one produced in ten seconds only. The only obvious difference is that in one square the difference in exposure does not force itself upon you. Blacken all the squares and write on each with pencil, try the experiment again, and the difference is palpable enough—*something* on the one plate, *nothing* on the other. Compare the times required to produce something in each case, and you have the result sought.

I have reason to believe that the relative rapidity of processes will shortly force itself upon the notice of many of the readers of these pages. When it does so, if they will secure an aggregation of dark objects in the shade, and compare the minimum times required to bring their details out, they may depend upon it that the true quantitative rapidity has been found. Try on objects with but little shade and brilliant lights, and the results are seriously misleading.

D. Winstanley.

NOTES ON PHOTOGRAPHIC HYGIENE.

[Concluded.]

The hygienic interest, so far as direct liability to rapid poisoning is concerned, centres for the photographer round cyanide of potassium. It will have been noticed, too, that in dealing with this substance Dr. Napias can hardly have been said to touch upon the hygienic aspect of the question at all, and for the very best of reasons—cyanide has no such side in his esteem. The only rule that can be safely applied to it is—leave it alone. It has, indeed, slower and more rapid effects on the system according to the strength of a man's constitution, to the method of absorption, or the frequency and incautiousness with which it is handled. Remedies may be found—such as ammonia—which mitigate the evil effects of many lesser manifestations of its influence; but the slower and more insidious approaches which it makes to the vital forces of the frame can only be guarded against by leaving it alone. This we take to be an accurate summary of the conclusions of Dr. Napias, and that they are on the whole fairly correct no one will question.

At the same time it must, we think, be remembered that the whole of Dr. Napias's experience is connected with indoor working, and that the argument that because madmen or cowards may find it a ready aid to their purpose of quitting the world is not a relevant one to the case. Too much should not be made of that against the poison, for the same fact would tell against the use of all poisons, and carried out to its complete *reductio* would lead to the thesis that all rivers, ponds, &c., ought to be abolished because some fool may drown himself therein.

We cannot too strongly endorse the statement of this excellent French physician so far as his experience carries him, however; for constant studio use of cyanide is, we believe, indubitably attended with the most disastrous consequences, in the long run, to the constitution. With open-air working, on the other hand, we believe the case is very different. If the operator, then, abstain from fixing his plates in a close box the air from which he breathes, and exercises moderate caution, he may use the poison with almost perfect impunity. We know photographers who have done so for more than twenty years, and it has been our own constant habit. The experience of those photographers will, we feel sure, bear out our own—that, upon the hardened cuticle of a hand used to working, cyanide, in what small quantities it reaches it, has no perceptible effect whatever, but that when breathed somewhat freely the poison produces strong nausea at once. In other words, the inhalation is almost as dangerous as the swallowing, and, therefore, the poison should never be used except out of doors, where the free air would carry its fumes (which are far more strong and volatile than photographers usually think) away. The practice of having an open, wide-mouthed bottle containing the cyanide in the dark room or tent is one of the most mischievous that could be adopted; but it does not, therefore, follow that all use of cyanide must be proscribed on all possible occasions, and sheer necessity almost dictates that it should be used for that outdoor work where its action is likely to have a minimum of evil consequences. It is only indoors where it ought to meet with uncompromising hostility.

But, leaving this subject, let us note briefly what Dr. Napias has to say regarding the other poisonous substances enumerated by him.

First amongst these is nitrate of silver—a strong caustic, the use of which, as he says, is not without danger. The phenomena attending its use are too well known to need describing, so far, at anyrate, as photographers' hands are concerned, and the best remedy for the stains on which is, undoubtedly, that dangerous substance with which we have been dealing. It is only when swallowed that there can be any danger in employing this substance, however, in which case it acts as an energetic irritant poison. Should it be accidentally taken into the system in this way the remedy, as almost everybody knows, is to swallow a strong solution of common salt, which at once converts the nitrate into the insoluble and comparatively harmless chloride. The danger is too small, however, to be worth dwelling upon; for the intense bitterness of the nitrate, when in a solution of any strength, makes accidental swallowing of it nearly impossible.

A more important chemical agent of the photographer is, in this view perhaps, bichromate of potash, now in daily use for carbon printing or enamelling. Its effects are displayed usually by an irritation of the skin, which comes first in small pimples and then in mattery pustules. This action of the potash is favoured by the same sores which help the cyanide to find a way to the heart. It seizes upon the least frayed spot in the skin, or the least scratch, to form the seat of an ulcer, which spreads rapidly all round, and behaves very obstinately under almost all kinds of treatment. Diseases of this kind are rather common amongst preparers of bichromate; and the particles of it which get into the atmosphere, and are absorbed in breathing, appear to tend to produce inflammation of the mouth and heady colds of a very tenacious kind, and which, frequently repeated, are apt to give rise to a singular and quite special malady—to wit, the perforation of the cartilage between the nostrils, so that communication is opened between them.

Photographers are not, however, in such extreme danger from this substance as that betokens, for few of them are so constantly subjected to its influences as to give it the power of doing so much harm; still it will often be found a cause of cold in the head, and sometimes of inflammation of the eyes and eyelids, as was the case recently within Dr. Napias's experience with a workman who imprudently drew his hands across his eyes after having handled some crystals of the salt. To avoid any danger of disease from this source it would be well to take the precaution of having a thorough wash after working with it—not of hands merely, but of face and eyes and mouth, and even of the nostrils.

Internally bichromate has the effect of a violent irritating poison, and poisoning by it is characterised by the inflammation or even cauterisation of the mucous membrane of the mouth, throat, and stomach, and induces dreadful cramps in the upper region of the abdomen, with violent vomitings, often partly of blood. When absorbed and taken into the circulation it interferes dangerously with the respiration, induces extreme coldness in the hands and feet, accompanied with diarrhœa as in cholera. At an advanced stage paralysis more or less complete supervenes, and is the precursor of death. The antidote for this poison is much simpler than that for cyanide, and whenever anyone, through either accident or design, has come under the power of this drug, it should at once be applied without waiting for a doctor. Such an one ought to be immediately made to swallow some warm water containing either milk or albumen, and at the same time the limbs ought to be vigorously rubbed with alcohol and ammonia (in the proportion of one part of the latter to twenty parts of the former), to restore the circulation.

Finally, we come to bichloride of mercury (corrosive sublimate)—a most fierce and dangerous poison, which, fortunately, is but little used by photographers, although sufficiently so to make it expedient that they should be put well on their guard respecting it. When the sublimate gets into a cut it produces a sort of local gangrene that eats deeply into the tissues of the body. Absorbed into the skin, either when that is healthy or when ulcerated, it induces abnormal salivine secretions, accompanied by softening, swelling, and ulceration of the gums, and extreme corruption of the breath. In these two cases chlorate of potash may be used with advantage dissolved, and either taken internally to cure the salivation or applied as a lotion to the places affected. When absorbed through the stomach the bichloride of mercury acts somewhat similarly to the bichromate of potash, inducing mucous inflammation, vomitings of blood, and the like. As in that case, also, the best antidote is white of egg taken either in milk or sugared water; at the same time zinc and iron filings may be given in a little honey—all remedies simple enough and within the reach of everybody. But, as we have said, the danger arising from this substance to the photographer is very small, and is probably now much less than it has been. Time was when bichloride of mercury was with some a favourite intensifier, and when it was largely used as a toning agent for transparencies; but platinum and other substances have long superseded it in the latter function, while the certain ruin to which any negative treated with it was destined has caused it to be also discarded for the former. It is not so absolutely outside the pale, however, as to make a word of warning or direction, such as is here given, entirely superfluous.

Dr. Napias has, and we think wisely, confined himself to these substances and to a few general observations upon the atmospheric condition of dark rooms, effects of fixed positions of the body, and the like. His position as doctor to the Photographers' Employés' Mutual Help Society in Paris has given him peculiar facilities for studying this subject, and will necessarily add weight to his remarks with those of the profession on this side of the channel. The directions appear to us quite perfect in their simplicity and absence of scientific parade; and, although it might not be wise in anyone to try the effect of the poison in order to test the cure, knowledge of this kind should be an additional element of confidence as well as a cause of wariness in the photographer when dealing with the many noxious elements with which science has hitherto condemned him to work.

SUNDRY ITEMS.

If you were to throw a valuable diamond into one of our public thoroughfares the chances are that it would be overlooked, or, if picked up, be deposited in some corner as a nice bit of cut glass; and, after a rapid retrospect of the information afforded to the fraternity through the medium of our publications, it is thought there is some similitude when it is observed how little of the wheat has been extracted from the chaff, and how many diamonds—possibly uncut ones—remain to be brought out of the mine of journalism.

Apropos of this, and while running through this carboniforous period, attention may be drawn to the use of graphite in photography. A real gem of a process, into which this substance enters, is that for which a society has granted a gold medal, and upon which process we recently have received valuable information through Mr. Edwards and from the pen of Mr. Woodbury in these columns.

Which of us, after producing a negative we thought faultless, has not found that it has proved in the printer's hands rather weak—just wanting those little sparkling lights to give the picture the required brilliancy? And who has not, under these circumstances, longed to be able to give "one more touch of pyro.?" In such a case the Obernetter method is just the thing. All that has to be done is to coat the back of the plate with the sensitive mixture, expose, and develope with graphite. It will seem somewhat strange that in this process under-exposure gives detail and over-exposure hardness; and as in the supposed case you want the high lights only, over-exposure is the correct thing.

There is yet another way of obtaining the same effect, and it only proves the truth of what Mr. Woodbury says in relation to the slight notice sometimes given to valuable hints. I refer to a process of M. Poitevin for obtaining carbon proofs on paper, which might be successfully employed, as before suggested. It consisted in forming a carbon tissue and rendering the *whole* of it insoluble with a solution of perchloride of iron and tartaric acid. This, when exposed again to the light, becomes once more soluble. So here we have the means of reproducing our negatives in a most useful manner, and by these means we might rid ourselves of the large stock of glass stored as negatives, and be perfectly certain as to the permanency of the result. It is almost superfluous for me to point out that a negative is produced in this case directly from a negative, and there is no trouble in transferring the film to develope. As it must be developed on the side upon which it is printed, clearly it cannot be used as in the Obernetter method; but the modifications to suit the changed circumstances are obvious.

Here is another use for this element, and one that, where rapidity is necessary, will be found very useful. It is old—indeed, very old—but will bear repetition, being a valuable aid:—If you want to put into a negative a broad light; or in the case of a group where the figures are unequally lighted you wish to equalise them; or a stained background requires to be altered, as a well-known artist says, "De tip tip is of no use—you vaund de broad sveep vid de vitevash prush;"—to obtain this get a block of blacklead (such as our domestics use), scrape off a little, then with a stump take up a portion and work over the parts required. The parts where the negative has been worked on will have the appearance of a black-leaded surface, the intensity will be considerably increased, and a great variety of effect can thus be obtained.

A new material for spotting *cartes* is advertised. Of its advantages I cannot speak, not having yet used it; but I offer a suggestion which, if carried out, would largely increase its sale. There are but few who would not become purchasers if the colour could be enclosed in cedar handles, something after the fashion of the coloured inks now sold by our stationers; for on spotting your *cartes* all you would have to do would be to sharpen your pencil and go to work, thus ridding yourself of sables, gum, &c.

En passant, Mr. Sutton speaks unwisely when he says [*ante* page 271]—"No such result as this can be achieved by common chromo-lithography." Similarly a member of a photographic society once said that photographs having half-tone could *not* be produced in carbon. You may safely say what is and what is not mathematically possible; but in these days of progress you cannot safely go beyond that. I should have but little hesitation in saying the direct contrary to Mr. Sutton's statement, and adding that *cartes* may be produced at a lithographic press in colours, and with all the gradation contained in the original negative; but as inventors are generally clever at over-estimating the value of their offspring, I had better, to use a Yankeeism, "dry up." However, when introduced in the legitimate manner I am sure Mr. Sutton will be one of the first to welcome it; for in the matter of progress—if it *be* progress—he is one who knows no country and has no favourites.

A considerable time ago Messrs. Harvey, Reynolds, and Co. introduced the invention of M. Grüne, under the designation of "*photo-diaphanie*." It was an albumenised paper, to be printed in the ordinary way, toned, and when in the fixing-bath the albumen film separated from the paper and could be transferred to any suitable surface. Its adaptability for the production of transparencies is obvious. The preparation of the paper, I believe, was kept secret. If it be yet in the market it might sell well, in these days of reproduction, as transparency tissue. Probably a layer of gelatine under the albumen would answer; however, the paper would rid us of the benzole now used with paper where the substratum is india-rubber. Possibly the paper referred to may have been so prepared. Were your former Parisian correspondent still in this world he might have supplied the information.

Another item, with which I must end my remarks (and it is not the least valuable of the items), is this:—Let any who may be troubled with a loss of brilliancy in their prints, owing to the solubility of the albumen in the sensitising bath, try the addition of alcohol to the aqueous silver solution, and it will be found to remedy the evil.

W. E. Batho.

A FEW WORDS OF ADVICE TO AMATEUR LANDSCAPE PHOTOGRAPHERS.

"Are you open for an 'out'—a run of between seventy and eighty miles into the country? There and back for nothing, and a fee over and above!" This was hurriedly addressed to me a short time since by one of my friends; and, as the offer was somewhat tempting, especially as I really felt that my lungs would be all the better of a little ozonising, and my eyes of looking on green fields for a few hours, I begged that he would enter into a little explanation. "Never mind explanation now," he replied; "get your traps ready tonight, and meet me at the railway station at 6.30 tomorrow morning, and I'll tell you all about it on the way."

Presuming that my friend had been commissioned to take some pictures of some out-of-the-way place, and not having much confidence in his ability, as his experience as an amateur was only of some few weeks' duration, I packed into my slides half-a-dozen 11 × 9 plates prepared with an emulsion containing a trace of free bromide. I chose them because, although slow, they are perfectly sure, and admit of much latitude in the exposure, while from half-a-dozen plates I can always calculate on half-a-dozen good negatives, which is more than can certainly be said of the more rapid emulsions with excess of silver. I do not wish my readers to assume from this that I undervalue the latter class of emulsions, as I frequently get excellent results with the large quantities of silver recommended by Mr. M. Carey Lea and Colonel Stuart Wortley; but I have a feeling that when I have to go a long distance, and am unusually anxious to secure a certain success, I am safer with the film containing a trace of free bromide.

Punctual to the minute I met my friend at the station, and we were soon leaving the city smoke at the rate of forty miles an hour. It turned out that he had been asked to recommend some photographer who would undertake to photograph the ruins of an ancient castle where a distinguished man had been born, and also a church in one of the vaults of which he had been buried; and, with a courage most frequently found in those who have just commenced to grapple with the difficulties of landscape work, my friend at once agreed to undertake the commission himself; and then with a somewhat laudable doubt as to his ability to do full justice to the undertaking had offered to share with me the pleasure, responsibility, and profit. The pleasure was certainly very great, and the responsibility little, but as for the profit—well, perhaps the less said about it the better. My amateur readers will be able to form a tolerably accurate estimate of what it would in the end turn out to be.

Neither he or I knew anything, or had ever heard, of the places we were to visit; but he had got such information and instructions that he had no doubt of finding them easily. We were to stop first at a certain roadside station, walk two miles to the village church, walk back again to the station, and take train to another station some fifteen miles further on, where a conveyance would be waiting to carry us to the castle—a distance of some eight miles.

On arriving at our first station we inquired of a one-armed porter in what direction we ought to go, and were told that it was "through the bridge and up the road and straight on till we came to the village." This was apparently clear enough, and so we started, congratulating ourselves on the prospect before us, the day being all that the most fastidious photographer could desire. The glorious sunshine of a May morning, gently softened now and then by the occasional passing of a white cloud, and not a breath of wind to stir the leaves, which on some trees had barely got beyond the state of bud, and on others, although fully expanded, had not assumed the full summer green so difficult to render in our negatives—just, in fact, the kind of day so well described by Herbert when he says—

> "The sun is laying all the trees
> In shadow, on their grassy bed."

Then there was an entire absence of the haze that is so often troublesome on such quiet days, and in consequence the hills that were, as we by-and-by found to our cost, at least five miles distant seemed to be within a quarter of an hour's walk. In a short time we arrived at a place where the road divided and went off in two directions, and, being in doubt as to which we should take, we rested till a native came up, of whom we inquired for the village of which we were in search, and he replied—"It isn't this road as I'm goin'; it maun be that'n." So we took "that'n," and walked on our way rejoicing. By-and-by, our traps becoming heavy, and in consequence the interest or, rather, the enjoyment of the walk diminishing, my friend laid down his knapsack and, seating himself upon it, declared that "if we *are* on the right road this is the longest two miles west of the station that I have ever walked." "West!" I exclaimed; "why, if the position of the sun be a guide, we must be going south-east by south, and are now a good three miles farther from the church than when we started." This, unfortunately, proved to be true. A countryman driving a flock of sheep made his appearance, and, on inquiring if he knew our village, he informed us that we were going in almost the opposite direction, but that if we would cross the fields towards the hills till we should come on a road which ran along their face, and if we kept along it for about three miles, taking the first turn to the left, we should, if we were fast walkers, reach our destination in an hour and a-half. I do not care to speak of the labour of that walk, of the gradual increase in the weight of our cameras, or of the intense heat of the sun; suffice it to say that we did at last reach the church and the village, and found, to our regret, that the only place of public entertainment for man and beast was the—public well!

Our work at the ancient church was limited to the two views really required, although we were strongly tempted to expose on a number of fine "bits" that were well worth a plate each. We had, however, lost so much time that we were reluctantly compelled to get back as fast as possible to the station; and, lest we should again make a mistake in the road, we hired a guide who, for a very small fee, acted as porter also, and so helped to make our return journey much more enjoyable. We were just in time to catch the train, and as we were getting our overcoats and some other things which we had left in charge of the one-armed porter, we were amused at the excellent illustration of the law of compensation he afforded by the dexterous way in which, mechanically, he slipped the articles he carried upon his arm so as to leave his hand in a position slyly indicative of an expected "tip."

A run of nearly three-quarters of an hour brought us to our next station, where we found a comfortable dog-cart waiting our arrival, in which in a few minutes we were bowling along most pleasantly. By-and-by, however, we left the turnpike road, and our route apparently lay along some fine green lanes. Here our pleasure was somewhat marred by our driver quietly informing us that he had only been in that part of the country a few weeks, and that he had no idea of how we should now go. This, with the experience of the morning still fresh in our minds, was certainly annoying, and the annoyance was not lessened by the failure of several attempts to gain information, which entailed several turnings up roads that we knew could not lead to the desired haven. At last, however, we came upon an old wheelwright busy painting a cart, who not only knew the place we wanted, but pointed it out to us, situated on a hill some three miles distant.

Our troubles were now ended, and in a short time our cameras were at work. The "castle" was in reality simply a square tower—all that remains of a former extensive building—surrounded with some fine old trees; but it and they together afforded some pretty good "bits" of work. Within half-a-mile of the castle we had passed a deep ravine, through which ran a winding streamlet crossed by a quaint wooden bridge, the sides of which were covered by whins in full bloom and numerous little trees of various shades of colour. In the centre, and close to the bridge, was situated a relic of other days in the shape of a pretty, tumble-down, thatched cottage, with a wreath of white smoke curling up in a straight line from its ample chimney. The picture was completed by an "old cart before the door, and an ass upon"—well, not upon the "lye," but quietly browsing on the grass near the house—and a number of children wading in the burn. Of course, with exposures of from ten to twenty minutes, we had to dismiss the donkey and children, and then set about our work as rapidly as possible. When, however, my friend had still three plates unexposed, and I had one, our matter-of-fact driver intimated that we had not another minute to spare if we intended to be at the station in time to catch the last cityward train; and so we were compelled to pack up and start on the homeward journey, arriving at a few minutes before eleven o'clock.

I need hardly assure my readers that the day was, on the whole, decidedly an enjoyable one. It could hardly have been otherwise; for my friend is one of the most genial and pleasant companions, and the day, as I have already said, was of rarely-occurring splendour and pre-eminent suitableness for our work. Still our pleasure was much curtailed, and the amount of work materially reduced, by our ignorance of the localities in which we were to be engaged. This ought not to be, and the advice I am about to give to the reader is that which I shall in future adopt on all occasions when I am privileged to tread on unfamiliar ground. It is to get the ordnance survey map of the district and study the locality, especially the various roads, thoroughly. Then to make a rough, but clear, outline in his note-book from the nearest railway station to the points of interest intended to be visited, and by the aid of a pair of compasses to measure and mark the distances in miles or portions of a mile. In addition to such a sketch the photographer should furnish himself with a pocket compass—not the sixpenny toy, the needle of which is liable to get jammed or come off the pivot altogether when most required, but a substantial, scientific instrument with an agate or jewelled bush, and which need not cost more than three or four shillings. Thus equipped he will be independent of guide or casual informant, will be saved many roundabout roads often taken to ensure a "short-cut," by economising time will be able to do more work, and will also find that the study of the geography of his own country is a pleasant occupation, and be led to wonder at his past ignorance of the interesting subject.

In conclusion: I may say that of the fourteen plates exposed only one has turned out a failure. Thirteen first-class negatives were soon ready for the printer; and I am certain the commissioner has had cause to be gratified with the manner in which his work had been done.

A North British Landscape Photographer.

Contemporary Press.

PHOTOGRAPHIC IRRADIATION.

[Nature.]

In a letter to this journal, vol. ix., p. 183, I gave a short description of some experiments on photographic irradiation. The conclusion to which these experiments pointed was that there is a kind of photographic irradiation, caused either by the bright light producing an intense state of chemical activity, which has the power of extending itself in every direction; or, what seems more probable, the parts of the collodion on which the bright light is falling become luminous and reflect light to the surrounding parts of the sensitive film, and thus extend the chemical change on each side of the true optical boundary line. As the subject is at present under discussion I send you the results of the following experiments, which seem to support the above conclusion.

In a darkened room a vertical opening eighteen inches by five inches was made in the shutter; over the opening was fixed a piece of paper thick enough to stop most of the light, and only allow as much to pass as would give a decided but not deep photographic impression. Three long, narrow, parallel openings were cut in the paper; one opening was left clear to the sky, the next was covered with one thickness of tissue paper, and the third with two thicknesses of tissue paper. There was thus produced three parallel bars of different brightness on a uniform and darker ground. Sensitive wet plates were prepared in the usual way on glass, and opaque black plates; across the front of the plates, and almost in contact with the collodion, was fixed a horizontal bar of thin blackened metal, in such a position that it would cross the image of the luminous bars in the camera. The photographs, after exposure, were developed in the usual way, and it was found that the shadow cast by the horizontal opaque bar was not bounded by straight lines, but the ends of all the bright bars projected into the shadow, and the brighter the bar the farther it projected. I had no means of measuring accurately the bar and its shadow, but there seems but little doubt that the bright bar extended underneath the opaque bar, whilst the edge of the darker ground at the side of the bright bars gave the correct line of the shadow.

Now this extension of the bright bars could not have been caused by the reflection from the back of the plate, as this result was always got whether glass or opaque black plates were used. Nor could it have been caused by the oblique pencils referred to by Lord Lindsay and Mr. A. C. Ranyard, because, the opaque bar being close to the collodion, these pencils could not get underneath.

The natural conclusion seems to be that this extension of the bright bars must have been caused by some molecular reflection taking place in the collodion.

This form of irradiation can easily be distinguished from the irradiation produced by reflection from the back of the plate, as the latter is simply a sort of haze surrounding the bright object, extending some distance from it, and gradually fading away, whilst the former extends a very short distance and has a well-marked outline, though not so sharp as those parts of the image where there is no irradiation. The irradiation produced by reflection from the back of the plate, and some forms of irradiation due to the imperfections of the lens, though fatal to artistic photography yet do not interfere much with its scientific value, as they do not affect the accuracy of outline, though they do affect the clearness of the photograph. Molecular irradiation, on the other hand, whilst it scarcely affects artistic photography, is fatal to scientific accuracy.

The manner of preventing this latter form of irradiation has been already pointed out, namely, by reducing the intensity of the light falling on the sensitive surface to only that necessary to produce a distinct impression. In artistic photography this is almost never possible, on account of the different amount of light on the different parts of the subject, while for scientific purposes this may almost always be done. The imperfections of the image due to the lens seem to be as various as the forms of lenses; one lens used in the experiment gave a curious double hazy-image of the bright object. When the image is near the centre of the "field" the double image fits over the true image, producing an effect somewhat similar to, and was at first mistaken for, the effect of reflection from the back of the plate. At first this double image was somewhat puzzling, as it always made its appearance even when opaque plates were used. The two images were, however, afterwards separated by bringing the true image near the outside of the "field," when the true image and its double were photographed alongside of each other.

The following simple experiment illustrates this molecular form of irradiation, and shows how much the definition of the image depends on the nature of the surface which receives it:—Take a camera obscura and throw the image on some translucent substance, such as opal glass; paint a small part of the glass with some opaque white substance, bring into the "field" some brilliantly-illuminated subject, such as branches of trees against the sky, and examine the image from the lens side of the glass, when it will be found that the image over the opal glass is hazy and indistinct, whilst the part of the image on the paint shines out brilliant and sharp. John Aitken.

Darrock, Falkirk, N.B., June 16, 1874.

Our Editorial Table.

A New Surveying Barometer.

W. H. Steward, 466, Strand, London.

The history of the aneroid barometer is simple. During the war in Egypt M. Conté, Professor of the Aërostatical School at Meudon, near Paris, made several balloon ascents in Egypt, and found the ordinary barometer subject to so much oscillation as to be useless. He then, in 1798, turned his attention to making one altogether of metal, in which the atmosphere should act upon a vacuum box the lid of which was kept distended by springs inside. The barometer of M. Conté was never very successful, and is now entirely discarded in favour of that of M. Vidi, who, in quite a different way, carried out the principle of atmospheric pressure acting upon a vacuum chamber. Vidi's barometer is the aneroid now in common use. The finest instruments are made in London, and are sometimes as small as a pocket watch, while they are extremely sensitive. By intelligently observing them photographers may take advantage of this great sensitiveness by being able to forecast, many hours in advance, the weather to be enjoyed or dreaded. But it is not merely as a weather glass that the aneroid is useful to a photographer. It also forms one of the most delightful pocket companions a tourist photographer can possess; for it indicates with precision the exact height to which he has ascended during his peregrinations. By well-understood principles, and according to known rules, every ascent or descent from the point of observation is attended by a rise or fall of the indicator.

In the pocket barometer which has called forth these remarks Mr. Steward has introduced several valuable features. We particularly direct attention to the adjustment of the inches circle, in which the range is limited from 27 to 31. This apparently limited range affords the great advantage of the smallest movement of the hand being easily seen; for the indications are thus magnified to a far greater extent than could possibly be the case if the scale had been graduated, as it is in many barometers, down to 23 inches, when the divisions of the scale become so much reduced as to necessite the use of an eyepiece to note accurately the various indications.

The altitude scale of this barometer is so constructed that variations of ten feet in height can be distinctly read by the unaided vision; and the excellence of the fitting, combined with the large divisions of the scale, render it easy to compute the precise height not merely of a mountain but of one of the upper rooms in the house in which the observation is made. Hence its value as a pocket companion during a photographic campaign, or even during a short walk in an uneven district of the country. Mr. Steward's barometer, which is also graduated to indicate the depth of the deepest mines as well as the height of mountains, should be as popular as it is useful.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF FRANCE.

At a meeting of this Society, held on the 5th ult., the chair was occupied by M. Balard (of the Institute), President.

A letter was read inviting the Society to take part in the International Congress on Geographical Sciences, to be held in Paris in the spring of next year.

M. Piquée, photographer, of Froyes, forwarded to the Society a sample of an albumenised paper print coloured with pulverised dry colours. His mode of operating, by which he says he obtains with great speed effects that are only slowly reached with the brush and wet colours in the ordinary way, is simply this:—The surface of the albumenised paper is abraded by rubbing it with powdered cuttle-fish bone under the finger. The parts to be retouched becoming thus "matt" the dry colours can be applied with a stump of elder pith or very soft cork. Where vigorous effects are wanted, as in accessories, the surface may be abraded with a knife. China ink is not be used at all in this process. The proof done in a quarter of an hour showed what might be effected in this way.

A number of pamphlets having been duly tabled, and the donors thanked,

The Secretary proceeded to go through the foreign journals. First amongst matters of interest were the announcements of the formation of the Belgian Society and the organisation of the Amsterdam Exhibition, already known to our readers.

With reference to Lord Lindsay's starch dry process, which, according to our contemporary, is to be used by that gentleman in photographing the transit of Venus, and which is recommended for the stability which it gives to the film, and the absence of contracting and expanding tendencies in varying temperatures,

M. A. Martin said that the starch now usually obtainable was rice starch—a kind totally unfitted, from its producing a clotchy or granular deposit, for the purpose of a preservative. Wheaten starch alone ought to be used if good results were to be looked for.

The Chairman suggested that M. Martin should write to Lord Lindsay for fuller details of his process, which, from the description in the English paper, appeared to be one possessing great advantages for scientific photography.

M. Davanne moved that three additional members be added to the committee of administration, which, he said, was too small. Other occupations often prevented members from attending, so that sometimes they had not a quorum.

The members agreed to the motion.

M. Davanne then proceeded to read a lengthy communication which had been received from M. Rodrigues, of Lisbon. It may be in the recollection of our readers that this photographer forwarded at the end of last year a sealed packet, which he desired to have placed in the archives of the Society till such time as he gave authority to have it opened. That authority had now been given, and the communication was found to be a description of a process in printers' ink based on the employment in a peculiar manner of thin plates of tin. The paper is far too long to embody in this report, but the subject is one to which we may return, as it appears to be at least an ingenious application of the art.

The report of the exhibition was then brought up by M. Gobert. From it we learn that a great silver medal has been given to M. Roussillon, the manager of MM. Goupil's works, and that forty-five other medals or honourable mentions have been bestowed by the Society. Amongst these there are the names of W. Bedford (medal), W. England *(rappel de medaille)*, D. Hedges, of Lytham (medal), Mr. Johnson, London (medal), and Mr. Woodbury (medal). Messrs. Brownrigg, of Dublin, and Diston, of Leven, Fife, have received honourable mention. Exhibitors have come from all parts of the world, and amongst the medallists is a gentleman hailing from Tiflis, in Russian Georgia. The list is indeed surprisingly cosmopolitan, and affords a very good gauge of the esteem in which the Paris Society is held all over the world—a most marked contrast to the miserable abortion which here in London is such an unconscionable time in taking itself off the face of the earth.

M. Davanne showed a proof which had become completely faded through being kept a long time in a cellar during the war. It was a valuable memorial to the family to whom it belonged, and they had sent it to him, asking if it could be revived. Recalling some experiments of M. A. Girard he had essayed the task, and members would see that he had succeeded. Without being absolutely perfect, the reproduction gave a very presentable print.

M. Gobert said he had to point out a fact of the same kind which showed the value of photography in legal investigations. The case he alluded to was a cheque which some forger had very cleverly altered. He had effaced, by means of one of those preparations known as "*encrivoire*," the writing expressing the sum originally drawn on the cheque, and had replaced it with a much higher amount. Chemical analysis had given only incomplete results. The idea then occurred to M. Gobert to photograph this forged cheque, it having been in his mind, as in M. Davanne's, that the lens often sees what the eye cannot. Much to his satisfaction the original writing came out clear and sharp on the plate under that of the forger.

The Chairman said that the public usually saw in photography nothing but a means of taking portraits and landscapes, while every day saw it becoming of more value in scientific inquiries to which its exactitude, its rapidity, and its peculiar qualities made it a most necessary adjunct. How many illegible manuscripts might be given to the curious and the learned if they were only deciphered by photography!

In presenting some prints of pictures taken by him at Nice, M. Davanne entered into a lengthened account of his experiences. His object, he said, was to draw attention to the qualities, and also to some of the failings, of the lens he employed—in reality, to make a pretext for asking opticians to improve the excellences still further, to correct the weaknesses, and, if possible, to give in a simple, light, and handy form a lens which might be of vast use to tourists. The lens he used was a Dallmeyer's wide-angle rectilinear—a name it deserved, for it gave straight lines and embraced (under limitations) an angle of 80°. After describing the lens, he proceeded to say that using it in its form as delivered he found it valuable for giving almost panoramic views of a subject, in which way it was very handy, superseding the clumsy panoramic apparatus, which a tourist cannot often carry. With the front of a building or any plane surface the results were not, in one point of view, so good; for, though the lines were straight, the sharpness, even with the smallest stop, decreased rapidly from the centre to the extremities. With a landscape it was a comparatively light matter to sacrifice some parts in order to get an agreeable *ensemble*. If the nearer objects were at the sides, and the more distant in the centre, sharpness might then be pretty generally diffused; thus the lens was admirable for receding views, such as street scenes, narrow gorges, or interiors. The great shortness of focus exaggerated the perspective a little, but to that photographers were accustomed. M. Davanne's views were of this order, taken at Monaco, Mentona, Villa Franca, &c.; and one of the Moorish *salon* of General Chanzy's wife, in Algiers, done by M. Magny, was a particularly good example of difficulties overcome. Passing on, M. Davanne spoke of the great advantage which he found from the two combinations of lenses composing this doublet being of different focus. Thus the front one, which is the longer, gave fine views with the large stop. The shorter-focussed lens did not work so well. Whether the fault was inherent in its construction or not M. Davanne could not tell, but it does not cover at all satisfactorily. It was quite necessary for the wandering artist to have lenses of different focal lengths, and he summed up his conclusions on the matter by saying that he would like a landscape lens which would cover a square glass of which the sides would be double the focal length of the lens, and that with straight lines and even lighting; and that this lens should be composed of two combinations of different focal lengths standing to each other as five to three. Mr. Dallmeyer's lens, he said, nearly met all these requirements, and he only hoped it might be made to do so more perfectly. He did not wish to lay down an arbitrary rule, but simply to give some idea of the lines upon which such perfecting should run.

M. A. Martin said that a change in the position of the diaphragm would correct some faults of the compound lens. Hence, when the lines were barrel-shaped the diaphragm was too far from the back lens, and when it was too near the reverse effect was produced. Diaphragms ought, in his opinion, to be movable backwards and forwards.

M. Lampné said that M. Darlot had made a case of eight lenses, usable singly or as doublets, which appeared to him capable of meeting all the conceivable requirements of tourists. He, at least, had never met a difficulty which these Darlot combinations did not enable him to overcome.

M. Davanne replied that he had used the Darlot set, and used them still; but the lenses in it numbered eight, whereas he wanted to gain his end with only two, or, at most, a third might be added to meet exceptional emergencies. He thought opticians, when aware of the want, were not likely to be long in supplying it.

M. Despaquis recalled a statement he had made a few months ago as to a process of retouching specially adapted for enlargements, and stated that since then he had so simplified his *modus operandi* that any one could do the work. He wished the Society to appoint a commission to try and report upon it.

The meeting decided to send the process to the ordinary testing committee.

M. Lampné remarked that the journals contained a crowd of processes of this kind, which, when practical men tried them, were often found worthless, although it might not always be so. He then proceeded to cite instances, mentioning, amongst failures, the numerous attempts to accelerate or supplement exposure.

M. Davanne said the Society did not guarantee everything registered in its *Bulletin*. It published whatever was interesting, but only on the responsibility of the writers.

M. Cazette exhibited a print burnisher, which the members said was very similar to one shown in December last year by M. Guilleminot. After some commendations on its working, and thanks, the meeting was adjourned.

Correspondence.

FUMING POSITIVE PAPER.—MOIST PLATES.

FUMING POSITIVE PAPER.—I spoke in a recent letter of the unquestionable advantages resulting from this treatment. To fume paper is a troublesome affair, if the right way to do it be not properly understood; if understood, the trouble is so little as not to be worth speaking of. Even here, where fuming is universal, many manage the operation on bad plans, and so take much unnecessary trouble.

The fuming arrangements ought always to be so planned that the paper can be fumed without the need to handle it after drying. To accomplish this the paper should be dried in the fuming-box itself, and then, when wanted, the basin of ammonia is simply put in, the door shut, and, as soon as the fuming is finished, the door is opened, the ammonia removed, and the door *left open*, so that the paper may air. I need not describe the box suitable for both drying and fuming, as an excellent arrangement was described and figured in your columns by Mr. Tunny, I think, in 1873. One thing is to be observed—the door of the box should always be left open when not in use, so that it may be thoroughly cleared of ammonia fumes, lest the paper be affected *whilst drying*, and before it is intended to apply the ammonia gas.

My box somewhat resembles, but not entirely, that described in your pages by Mr. Tunny, and I think is better in this respect—that the door, instead of opening sideways, is fastened by "strap hinges" to the top, so that, when opened, it lies flat on the top, and is completely out of the way. The top is mortised into the sides with two rebates, so that the joints cannot open and let in light. The paper, after drying, can be left in until wanted, even in a brightly-lighted room. The back should also open, both to accelerate the drying of the paper and to get rid more rapidly and completely of the ammonia fumes.

Fuming has two very great advantages independently of the improvement to the print, and these advantages are so important that it would be worth while to use it for them alone; yet these two advantages I have nowhere seen mentioned.

The first advantage is *that the time of floating the paper on the bath is very much shortened.* In the text-books it is generally directed to float three to four minutes, and sand-glasses are often used to time. I find that with a fifty-grain bath *half-a-minute* in hot weather and one in cold on the bath is ample. The saving of time is, therefore, about three minutes to each piece sensitised, and in sensitising ten or twenty pieces there is a clear economy of half-an-hour or an hour's time. The printing-bath is much less fouled and also less exhausted. Probably this less exhaustion of the bath makes up for the difference between the use of a thirty- and of a fifty-grain bath. This difference, indeed, when the improvement to the prints is considered, is not worth regarding; but if it were, I think the shorter floating would make up for it.

The second advantage is that if the paper is to be fumed it may be prepared in such a way that it will keep for weeks and months—as, for example, by the use of tartaric acid in the manner which I proposed in your columns two or three years ago. Paper that is to be exposed to the alkaline fumes of ammonia may be prepared on a very acid bath without injury to the final result, because the acidity is perfectly removed by the fuming.

Here, then, are three distinct advantages gained by the fuming:—First, and chief, a better print; second, a great saving of time, and an incidental preservation of the positive bath; and, thirdly, the facilitation of the use of a paper that will keep. These far more than counterbalance the trouble incident to fuming—a trouble which, with good arrangements, become wholly insignificant.

Probably one reason why ammonia fuming is less practised on your side of the Atlantic than it should be lies in the absurd directions that have been given for the details of the process. I have seen recommended, for example, to fume the paper from twenty to thirty minutes, whereas, if the box be small and the ammonia strong (as it should be), *five minutes* is the time I find answers best. With a larger box a little more time may be given, and, of course, if the ammonia be weak the time must be proportionately increased. A long fuming interferes with the toning, and may even injure the texture of the paper.

When the operation is conducted as I have described, the albumen surface of the finished print is as perfect as can be desired; the short floating on the fifty-grain bath sets it perfectly. It is to be also remembered that the action of the silver nitrate on the albumen does not necessarily stop on removal from the bath, but, if then incompletely may continue whilst the paper is moist. Directions given also err almost always in not explaining this shorter floating as being conducive to the excellence of the prints.

The toning of fumed prints is conducted in the same manner as with unfumed. But I may here take occasion to say that when an acetate bath is used it is, I think, always a mistake to use it within twenty-four hours after mixing, even if mixed warm. It will tone in a much shorter time than that; but the tones are certainly finer when the bath has been kept for not less than a day.

In looking over some remarks on toning-baths in two well-known text-books lately I was amused at the extreme diversity of opinion expressed. The one authority declared that a toning-bath was never in order for use until it had completely lost its original yellow shade. The other affirmed that when a toning-bath lost its yellow shade it was an indication that it had passed into an inactive condition and needed more gold solution.

Moist Plates.—During the past year or two a good deal has been said of the honey-glycerine process and other methods by which a plate is kept wet for half-a-day. I was myself at one time an earnest votary of the honey-glycerine process, and made, certainly, a hundred or more plates by it in the field. My first trials were on some buildings, and these negatives printed very nicely. I then took a number of landscapes, and laid the negatives aside to be printed in the winter; but the prints were rather disappointing, although the negatives looked very promising. Now, after an interval, when I compare these older results with those since obtained by the chloro-bromide process, I find the advantage altogether on the side of the latter. The best chloro-bromide negatives are of a grade altogether higher than the best honey-glycerine. Some of the chloro-bromide plates that I consider only tolerable are as good as the best honey-glycerine. Many subjects can be successfully attempted with the one with which the other cannot cope at all. It is a waste of time to work with any but a first-class process.

When a wet plate is wanted to be kept for several hours it should be passed through a ten-grain bath of silver nitrate after having been prepared in the regular way. A strip of blotting-board an inch wide should have an edge of an eighth of an inch turned up, and this edge should be slipped under the edge of the plate. As much water should be added to the collodion as it will bear without making crapy lines. With a porous film—such as is obtained with a watery collodion—bathed with a pure bath uncontaminated with the impurities which gather in an ordinary bath, the plate will keep for a long time. The chief danger remaining is of marbled stains, sometimes called "oyster-shell" marks. These are caused by the re-absorption by the film of bath solution that has collected at the lower edge of the film. Some years ago I hit upon the plan of bending a piece of blotting-board so that its edge should pass under the edge of the plate and touch the edge of the film. This I found to be a most excellent plan whenever the plate was to be kept more than the usual time. Some years since I sent a print from an 8 × 10 negative to the Editors of this Journal which had been kept three hours between sensitising and developing, and in the interval was carried twelve miles without any other protection than the above. The slide was not wrapped in a wet towel, as is often done. The negative was excellent. This, however, appeared to be the limit attainable in that way; for when an interval of three hours and a-half was tried the negative showed drying spots in development. M. CAREY LEA.

Philadelphia, June 22, 1874.

MEDALLISTS OF THE FRENCH EXHIBITION OF PHOTOGRAPHS.—ALCOHOL IN THE PRINTING-BATH.—SPECIMEN PORTRAITS.—HYGIENE.—COLOURING WITH DRY POWDERS.—NEW TREATISES.—STARCH PROCESS.—RESTORING FADED PRINTS.—PICTURE VARNISH.—MOISTURE IN PRINTING.

THE last number of the *Bulletin* of the Photographic Society of France contains a list of those exhibitors to whom medals and honourable mentions have been awarded for works sent by them to the Society's exhibition, now open in the Palais de l'Industrie. The highest award, viz., a large silver medal, has been given to M. Rousselon, the manager of MM. Goupil's establishment at Asnières, near Paris. There can be no doubt about the justice of this award when we remember that to the persevering labours, good taste, and ingenuity of this gentleman are due the successful introduction into commerce of Mr. Woodbury's processes of printing in pigments, and photo-engraving—the two best processes known at present for producing permanent photographic prints by mechanical means. However right in principle a process may be, it requires a man of this sort, backed by a moneyed firm, to grapple with all the practical details of manipulation which are necessary to carry it out on a large scale; and the more credit is due to M. Rousselon when we call to mind the failures which had previously attended the attempt to introduce the Woodbury process in England in the hands of two different companies, and in Paris in the hands of Mr. Bingham. Besides which, to M. Rousselon is due the discovery of an absolute novelty in *principle* in connection with Mr. Woodbury's photo-engraving process, inasmuch as he has substituted for the sand which that gentleman mixed with his bichromated gelatine, in order to get an ink-holding surface in the plate, a chemical agent which is sensitive to light, and which gives a grain in proportion to the degree in which light has acted. All this has been well understood by the jury, and they have awarded to M. Rousselon the highest medal in consequence.

Amongst the other medallists but very few English names appear, which is a matter of regret, since the exhibition is the finest in Europe, and attended by the largest number of visitors. These are—Bedford, England, Johnson, Woodbury, and the less-known names of D. Hedges, of Lytham, and Brownrigg, of Dublin. How is it that our leading London portraitists either did not exhibit at all, or exhibited nothing worthy of an award? No other civilised country but England is in so extraordinary a predicament as to be thus unworthily represented in photographic portraiture in the leading photographic exhibition of Europe.

Whilst on the subject of photographic exhibitions let me remind the reader that on Sept. 14 will be opened one at Amsterdam, under the direction of the Society, "*Arti et Amicitiæ.*" It will close at the end of October. Proofs will be in frames, but without glasses. No re-touched or coloured proofs will be admitted, and none that have been publicly exhibited before. Address, "*A la Comission Directrice de l'Exposition, à la Société Arti et Amicitiæ, Amsterdam,*" before the end of July.

M. E. Thierree, of Bresles (Oise), strongly recommends the addition of alcohol to the printing-bath, as aiding to coagulate the albumen and give vigorous proofs, whilst it keeps the bath bright.

An anonymous writer in the *Moniteur* puts his professional brethren of the camera on their guard against persons who call at a studio to have their portraits taken, and order a specimen print to be sent to their hotel, after which no more is heard of them by the artist. He adds that tourists may in this way fill their album with portraits of their honourable selves, and have lots to give away to their friends besides, without putting their hand in their pocket. He suggests as a remedy that all specimen prints should be defaced by a stamp bearing the name of the photographer.

Dr. Napias has concluded his interesting series of articles on the hygiene of photography by treating very sensibly of silver nitrate, bichromate of potash, and bichloride of mercury. He is physician to the *Société de Secours Mutuels des Employés en Photographie*, and is well informed as to the evils attendant on the use of dangerous poisons by photographers and their assistants.

M. Poirier, of Paris, is now advertising presses for enamelling *cartes-de-visite* at twelve francs each.

At the last meeting of the French Photographic Society M. Carette exhibited a new glazing press, and demonstrated its mode of action.

There is to be an international congress of the geographical sciences at Paris in the spring of next year. It is hoped that photographers will lend their valuable aid. The congress is composed of *membres adherents* and *membres donateurs.* The subscription for the former is fifteen francs, and for the latter fifty francs. Subscriptions should be sent to M. le Baron Reille, 10, Boulevard Latour-Maubourg, Paris. There will be an exhibition of objects relating to geography, and medals will be awarded. Ethnological photographs will, no doubt, be largely appreciated.

M. Piquée has brought out a new method of colouring photographic portraits upon albumenised paper by means of dry powder colours or chalks applied with a stump. It is a sort of extension of the Vanderweyde process, and is said to be more suitable for large than for small portraits. The albumenised surface has to be rubbed with powdered cuttle-fish bone until it is quite matt before the colours are applied. A proof can be coloured very satisfactorily in this way in a quarter of an hour by a skilful artist.

Captain Hannot, chief of the photographic department of the Belgian *Depôt de la Guerre*, has just published a pamphlet entitled *Les Elements de la Photographie.*

M. Gaston Tissandier has also published a pamphlet entitled *L'Heliogravare, son Histoire et ses Procédés, ses Applications à l'Imprimerie et à la Librairie.*

M. Martin cautions those who are trying Lord Lindsay's dry process with a starch preservative not to use the starch from rice but from wheaten flour. I am under the impression that starch is used in the preparation of Stebbing's dry plates, the films adhere so tightly to the glass. I shall be curious to hear, by-and-by, how Lord Lindsay gets on with his starch-organified plates in photographing the transit of Venus in December next.

And this reminds me to mention that the French expedition is to be provided with daguerreotype as well as with collodion plates. What a pity that our own astronomical photographers do not take the hint! But I believe I am right in saying that our Astronomer-Royal places but little confidence in the value of photographic observations of the great coming event.

M. Davanne has exhibited a copy which he has made of a faded print, and which seems to possess much of the beauty and perfection of the original before it had changed colour. Although we know of no means of restoring faded prints, yet by means of the camera we can take a negative copy very fairly, from which good fresh prints may be obtained. I tried this plan last year upon a valuable faded portrait, and was pleased to find how successful the result was. A good vigorous negative, a little smaller than the original, was obtained, lacking none of the details or half-tones. The yellowish-brown colour of the shadows of a faded print is favourable for copying; and by putting the print in a strong light, and using an old slow collodion, a good dense negative can be obtained, with sufficient force of contrast, and quite pure in the lights.

A very interesting letter appeared in *The Times* the other day, entitled *National Gallery Varnish.* It was from the pen of Mr. Robinson, of York-street, Portman-square. Photographic colourists in oil are so much interested in the subject of a good varnish for their portraits that I will endeavour to sum up briefly the contents of this letter:—

The writer tells us that oil paintings are first painted with pigments which are ground in linseed oil, and that they are subsequently glazed with transparent colour ground in varnish. Every artist is well aware of this, and also that the chief beauty of a fine oil painting lies in the glazing and scumbling. I can assert from my own personal knowledge of the late Mr. Etty that his pictures were first painted in the common way, and that the whole of his extraordinary beauty of colouring was accomplished afterwards by the glazing and scumbling. It follows, therefore, that the greatest care must be used, in cleaning an old painting, not to remove any of these delicate tints. The proper varnish to varnish an oil painting with should be, Mr. Robinson informs us, gum mastic ground in turpentine, and no oil should on any account be added to a picture varnish, because in the course of time this oil will become incorporated with the groundwork of the picture—or the "first painting,' as it is called—and then, when the varnish has become discoloured by age, it cannot be removed without also destroying all the delicate glazing tints.

The logic of the above appears to be quite sound; and the author adds that a considerable number of the pictures in our National Gallery, and in the private collections of the nobility and gentry, have been hopelessly ruined by being varnished with a varnish containing oil, called "National Gallery varnish," which was introduced by a "disastrous man" named Seguier, who for some years had the control of the national collection.

Beware, then, dear reader, of adding oil—but more particularly *boiled* oil—to your picture varnish. *Boiled* oil, we are told, is especially bad, because it actually becomes black and carbonised by time—the gradual oxidation of it being a sort of slow combustion.

Our Editors have alluded to the inferiority of prints upon chloride of silver paper when both the paper and the atmosphere are unusually dry. It is evident, I think, that water, or moisture in some form, must be present in order to enable the sensitive film to be decomposed by light. We know that during the process of printing acid fumes are given off from the paper, and that to such an extent as to affect the pads in the pressure-frame. But how could an acid be formed out of the decomposition of chloride of silver *plus* nitrate of silver unless moisture were present? How can Ag Cl, together with Ag NO_3, evolve an acid without the presence of hydrogen, unless we suppose the acid to be some compound of chlorine with oxygen, which I believe it is not? There is organic matter present also, it is true, but it is hardly likely that hydrogen could be obtained from that source. It is pretty evident, therefore, that this darkening by light of common chloride of silver paper cannot go on without the presence of moisture.

M. Davanne has pointed out lately some practical advantages in an unsymmetrical doublet. It gives you, for instance, *three* different focal lengths of lens for your picture; whereas, a symmetrical doublet gives you only two. There is some advantage in this, no doubt.

July 10, 1874. THOMAS SUTTON, B.A.

EMULSIONS.

To the EDITORS.

GENTLEMEN,—Several allusions in your last to the emulsion process and the conditions of success in it bring me "on my feet" to say something about the result of my own experiments in that direction.

The opinions of Mr. Gough and Canon Beechey, both experienced emulsion workers, seem to differ largely on the point of the necessity of a certain quality of pyroxyline for the emulsion; and, as I think I may safely assume the right to a clear opinion in the matter, I will venture to say that both are right in some particulars. There is, as Mr. Gough claims, a large margin; but there are, again, certain qualities of pyroxyline with which no intensity can be obtained. The cotton may be powdery and still produce an image which no manipulation will intensify; and it may be tough and, by proper treatment, still produce an intense image.

Mr. Gough has very great experience, running over many years, and as he always makes his own emulsion, and is a most careful as well as successful experimentalist, his opinions are almost invariably well founded and on a thoroughly-understood basis. What he says of tannin and silver is absolutely correct. Tannin and free nitrate of silver *will only coexist in the film* by the use of nitric acid enough to restrain all reduction until the film is dry, when it is safe till the least moisture attacks it; but what must be the sensitiveness of the film in which so much nitric acid exists? I regard this notion of the union of free silver with tannin as a simple delusion, except on the above condition, and one incompatible with the highest sensitiveness or with keeping qualities.

As to the difference between *aqua regia* and nitric acid, I have carefully and elaborately experimented, and find not the least advantage in *aqua regia* in any respect, and, in fact, adding hydrochloric acid, as I long ago pointed out, is simply liberating nitric acid; but, as I have long given up the use of either of them for emulsions, I am free to say that I do not know which is the worse nuisance.

The fact is, all the soluble elements are washed out of an emulsion film so quickly, when the collodion is of a porous character, that even in the time required for soaking in the preservative there is ample opportunity for the free nitrate to escape. I think that many cases of free nitrate are accounted for by the fact that nitrate of silver is so largely adulterated in many cases that the supposed excess does not exist. I personally have never been able to keep free nitrate in the film and use tannin in the preservative, even using nitric acid in small quantity; and when one puts in *aqua regia* in uncertain quantities there is the greatest uncertainty as to the presence of free nitrate.

When we talk of putting in three or four grains excess of nitrate of silver (atomic weight 170) and three minims of *aqua regia*—that is, two of hydrochloric acid (atomic weight 35·50), as some of our experimenters have—we are much in the region of unknown quantities. Mr. Sutton long since said, and *well* said, all that could be advanced on this question of free nitrate in the film; and I have only to say that I doubt its possibility in a useful film, or its desirability if it were possible. If anybody cares to follow this "Will-o'-the-Wisp" let him—I do not.

In regard to this question, in fact, as to that of preservatives, I have long ago got past the need of Canon Beechey's advice, in his last letter, *apropos* of my experiments in behalf of the Liverpool Dry-Plate Company. The new emulsion now issued by that Company not only has neither free nitrate, nitric nor hydrochloric acids, albumen nor any other of the new additions, metallic nitrates included, and is as sensitive as anything I have been able to make, *of a useful density*, with a greater delicacy of image and freedom from all faults of emulsion than I have ever attained by anything, except collodio-albumen. I have not complied with any of the conditions laid down by Canon Beechey, and yet the new emulsion is as sensitive, as intense, and as manageable as any I have used, requiring neither washing nor preservative. In fact, the emulsion contains nothing that can be washed out, and nothing that can cause deterioration, so that it keeps indefinitely without any change. I have tested it on all kinds of subjects and with all range of exposures, after keeping for months as well as when first made, and I am so well satisfied with it for my own use that I shall never carry prepared plates on a long journey again where the trouble of carrying them is worth considering. A package of albumenised plates (or plates bought and albumenised *en route*) and a bottle of emulsion are all that is necessary to do the best emulsion work I have ever done.

Why, therefore, should I trouble myself any longer about preservatives or free nitrates? As to these plates keeping, of course we have only a few months to speak from; but I will guarantee that they will resist any heat which does not scorch the film and any degree of cold that does not break the glass for the time necessary to make a journey to China and back, providing always they are are kept from damp and foul air. When we can count with certainty on the quality of pyroxyline I venture to say that a hundred gallons of an emulsion may be turned out whose results shall be always the same, and which, saving faults of manipulation, will give the best results any emulsion can give, and remain unchanged while there is an ounce in the bottle.

As to sensitiveness: I can only say that these plates are capable of being forced to almost any extent, so that for well-lighted subjects I have given from two to twenty seconds with the stereoscopic rapid rectilinear lens, full opening; but the long exposure invariably gives the best results. In fact, I fully agree with Gordon and Gough and all others who abuse quick emulsion—that is, emulsion with short exposure and forced development. The negative is invariably much poorer than when abundant exposure is given with moderate development.—I am, yours, &c.,

8, *Altenburgh-gardens, Clapham-common, London, S. W., July* 13, 1874. W. J. STILLMAN.

To the EDITORS.

GENTLEMEN,—Mr. M. Carey Lea makes a statement in your last issue which compels me to call attention to it. He says:—"Colonel Wortley advises salicine in place of some other constituent of my preservative formula." I recommend—and this recommendation has been endorsed by Messrs. Cooper, Gordon, Beechey, and others, including yourselves—a preservative composed of salicine, tannin and gallic acid, and am quite unable to understand how Mr. Lea can claim tannin and gallic acid as *his* preservative. He has no possible claim to it, and his desire to find fault with salicine has led him into a singular error.

I am gratified, on the other hand, to find Mr. Lea, after having till the publication of my paper in June, 1871, constantly written down any excess of silver over ten grains as "injurious," and that he "saw no use in loading down the collodion with silver," now recommending twenty-five grains to the ounce—an amount which, by the way, it is practically useless to add, as it cannot dissolve in solvents of a proper strengh to make a good film. He, however, thus entirely admits the correctness of the views I have long advocated in your columns, viz., that an emulsion must be saturated with nitrate of silver to start with in order to obtain the best results.

Further: Mr. Lea says:—"It is easy to make an emulsion keep indefinitely by the use of metallic nitrates." In this he again follows me, and admits the correctness of the views I have held on this point. True he says the sensitiveness is diminished; but here he is in error, and were he to investigate more closely would discover himself to be so.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove End-road, London, N. W., July 13, 1874.

"ON THE CAUSES OF HARDNESS."

To the EDITORS.

GENTLEMEN,—In your issue of the 10th instant there is a letter from Mr. E. Dunmore requiring some notice on my part.

Mr. Dunmore commences with an error. I did not write *On the Causes of Hardness*, but on SOME *of the Causes of Hardness.* Attention to this will dispose of his charge as to inconclusiveness, so far as regards the developer. Again: if Mr. Dunmore will refer once more to the article in question, he will come to the conclusion that charging me with presuming a bath to be worked without any precautions from youth to age is, to say the least, gratuitous on his part.

As to the "pleasant etherial smell:" some time ago the Editors of this Journal wrote an article on the use of strong and weak baths, which to me cleared up some difficulties on this point; and I think a flat bath-holder—such as are used on the continent more than in this country—would dispel the notion of the "pleasant etherial smell," and for reasons patent to any "intelligent operator."

I was always under the impression that a bath was distinguished from an aqueous solution of nitrate by being pretty nearly saturated with iodide of silver, and also that it would not work well until this was done; indeed, that it was *not* a bath—"not even a new one"—until then. As to how to do this I always thought it better to avoid obtaining at the same time a "pleasant etherial smell," otherwise I should expect to find the "most eccentric and astonishing results."

I am still of the opinion, notwithstanding Mr. Dunmore's contention to the contrary, that a bath gradually deteriorates; and were I to be troubled with the sudden demise of a bath I should look for some poison, and not suspect its ordinary food.

Unfortunately I cannot accomplish what Mr. Dunmore can, viz., "discard the use of spirit in the bath." With me it gets in somehow when I dip a plate. Perhaps (as spirit sometimes affects coherent thought) he means the developer; and as he admits that the action of spirit is pernicious, consequently he must admit that as it accumulates in the bath with work its pernicious action must be gradually felt, and hence there is a gradual, and not a sudden, deterioration.—I am, yours, &c.,

Blackpool, July 11, 1874. W. E. BATHO.

SPIRIT PHOTOGRAPHS.

To the EDITORS.

GENTLEMEN,—Referring to your article on M. Buguet and his professed "spirit photography," I beg to forward you several portraits of a friend of mine taken in London by M. Buguet with the "spirit" accessories.

My friend had unfortunately paid M. Buguet £5 for his work before I knew he intended to sit to him, or I should certainly have asked permission to be in the dark room while the plates were being developed, although I do not at all suppose that M. Buguet would have granted this.

My friend was apparently satisfied with the genuineness of the pictures, because there were no indications of the ghostly figure in the room when he sat. I therefore undertook to show him how a fraud might be perpetrated, and took for this purpose a photograph of him with ghostly figure, of which I enclose a print. It was produced by means of a transparency laid upon the exposed plate before developing, and exposing to light for a few seconds. You will observe that the effect is very similar to that in Buguet's photographs, and is quite incompatible with the result being produced by any fluorescent painting of the background, as the images of the "ghost" figure and table are melted together in both cases.

A curious fact struck me at once on seeing M. Buguet's photographs, and that is, that although my friend is an Englishman his attendant spirit has in every case—and there are six negatives with different figures in each—an unmistakable French cast of features. No doubt if a fresh attempt were made upon English ground the photographer would provide himself with transparencies taken from negatives of English sitters.—I am, yours, &c., W. E. DEBENHAM.

Regent-street, London, July 14, 1874.

[After a careful examination of the pictures referred to, we must award to Mr. Debenham the palm for having produced a far more genuine-*looking* "spirit" photograph than the alleged genuine ones of M. Buguet, which not more than one photographer in ten thousand would believe had been done in any other way than that so plainly hinted at by Mr. Debenham. The "spirits" are unmistakably French.—EDS.]

ANSWERS TO CORRESPONDENTS.

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

EXCHANGES.—In our next.

J. P. B.—It was published in our last volume.

G. WATMOUGH WEBSTER, F.C.S.—Received. In our next.

ST. MUNGO.—The Vanderweyde patent has not yet expired. It has still nearly six months to run.

"PARAFFINE."—We regret that your former letter was accidentally destroyed. Will you please repeat the query?

S. S. S.—There is nothing the matter with the pyrogallic acid. If you follow the directions given you will certainly succeed.

AN ATTACHED SUBSCRIBER.—It will probably surprise you to be informed that we quite agree with you; but, as the old proverb says, "desperate diseases require desperate remedies."

D. E. W.—We cannot advise you to purchase the apparatus respecting which you inquire. About eight years ago we tested one very thoroughly, and although we could take small pictures by its agency, yet we looked upon it then, as we do now, as nothing more than a toy.

B. H.—For printing lantern transparencies on a large scale we recommend you to adopt wet collodion and a properly-constructed copying camera. If due care be exercised in the selection and method of using the chemicals, the most perfect purity in the high lights will be obtained.

GORGON.—By placing the front lens of your large combination behind the back one of the *carte* lens the definition will be somewhat impaired, but the concentration of light will be greater; and, owing to the shortening of the focus, the image will be rather smaller than when the lens is used without such addition.

GEO. HOOPER.—We are sorry to have to confess that we have not yet read your article, and therefore cannot offer any criticisms on your suggestions. With respect to publishing it, our rule is never to reprint articles which have appeared in our home contemporaries, unless in very exceptional cases, and we trust Mr. Hooper will forgive us for thinking the present is not one of that class.

"CYANIDE OR HYPO." (Manchester).—The respective merits of cyanide of potassium and hyposulphite of soda as fixing agents for ferrotype plates might easily have been ascertained by yourself by the obvious experiment of a single trial. However, as you ask our opinion, we may inform you that pictures fixed by means of cyanide of potassium are much purer in the whites than those fixed by hyposulphite of soda.

A. B. C. (Jersey).—You may precipitate the silver from the fixing solution either by means of a solution of sulphide of potassium (liver of sulphur), or by passing a current of sulphuretted hydrogen through it. The latter is, on the whole, the preferable method. The precipitate will consist of sulphide of silver, which may either be dissolved in nitric acid or, better, sent to the refiners. Whichever method you adopt for precipitating the silver it must be done in the open air, owing to the offensive smell.

F. JORDAN.—A swing front to the camera will answer the same purpose as a swing back, but it is not so convenient to use. Seeing, however, that your camera is already made the back cannot now be altered, and no other course remains open than to adopt one of those we described in our last ALMANAC. We give the preference to that of Mr. Shadbolt, because it can be made to turn in every direction; if, however, you are satisfied with a single movement, that of Mr. Phillips will be equally efficient while more easy of construction.

W. G. PAGE (Daventry, Northampton).—Our correspondent encloses three charming landscapes taken in the "Dingle," Fawsley Park. They are all exceedingly soft and full of detail, the composition also being excellent.

AMERICAN DEGREES.—Mr. Stillman has written to us on the subject of the awarding of degrees by American universities. He says that, as a general thing, the curriculum of those institutions is as difficult to steer round the goal as that of an English university, and that *as a general thing, too*, their degrees are not given without *prima facie* evidence of merit. Neither Professor Towler nor anyone else has the right of giving degrees without a vote of the faculty; and Mr. Stillman does not know any American institution which is so desirous of destroying the value of its honours as to give them away at random. It will be difficult, he says, to persuade anyone who knows American colleges that a degree was given to the editor of our contemporary without his having done something to deserve it.——Respecting this much-talked of question of conferring degrees *in absentia*, some scholastics affect to decry them and look askance at those so honoured. But it is an open question whether degrees obtained in recognition of literary or scientific services are not, after all, more honourable to the wearer than those obtained while at college, which are in most instances the result of "unhealthy cramming, and are simply a certificate of good behaviour at school," as some writer puts it. Degrees *in absentia* are not granted by foreign universities in the indiscriminate manner imagined by some; for, except in the case of editors of scientific journals, public lecturers, and men of recognised literary position, to whom are courteously granted special facilities, the strictest proofs of being worthy of the honours applied for are demanded; and this is much more than could (until very recently) be said concerning those who apply for, obtain, and wear military distinctions, which, in most cases, are thus made a mere money qualification. There are numerous men well known to photographers whose degrees or titles emanate from foreign universities, among whom we may include Brewster, Roscoe, and Diamond, whose degree of "Doctor," if we have been rightly informed, is a foreign one. We could mention many others. It is right that we should inform Mr. Stillman that in America is situated one college, which of all others in the world is said to be the least scrupulous as to the literary or scientific character of those to whom it grants its degrees. But this one black sheep does not affect the fair fame of the other universities of really high standing in that country.

THE AMERICAN PHOTOGRAPHIC CONVENTION AT CHICAGO.—This Convention was to have been held on the 13th inst.; but just before going to press we learn by telegram that Chicago has a second time been devastated by fire, over twenty blocks of buildings having been destroyed. The photographic visitors would have arrived just in time to witness the commencement of the conflagration. How it will have affected their meeting we shall ascertain in due time.

PORTRAITS OF THE CZAR.—Messrs. W. and D. Downey have favoured us with a capital cabinet portrait of the Czar, taken on the occasion of his recent visit to this country, together with a *carte*-size group comprising His Majesty, his son, and the Duke and Duchess of Edinburgh. Mr. Downey has shown us a letter received from Baron Brunnow, in which he expresses, by request of the Emperor, his gratification with the various portraits. We believe that the firm named were the only English photographers favoured with sittings.

COLLODIO-CHLORIDE *IN EXTREMIS*.—The following paragraph is from the last effusion of "M. le Dr." Phipson, London correspondent of the *Moniteur*. From that it would appear that he exercises a sort of *quasi*-medical function as consulting physician for dying processes. We fear he will fail in this case to galvanise a dead thing into life again; for, beside the extremely unstable character of the collodio-chloride image, there are now so many better ways of getting to the same end that only very ancient photographers indeed are likely to pick up a forgotten waif, never of much significance, from the thickly-strewn wrecks that mark the path of photographic progress. It is no use—if we may advise this gentleman—the dead horse *won't* whip to life again, do as you may. The turn is friendly no doubt to Mr. Simpson, but it is anything but kind. Dr. Phipson says:—"Several photographers have written to me during the past and present month on the advantages of the collodio-chloride process invented by Mr. Simpson, and have expressed astonishment that this process, which provides a sensitised film in advance ready to be poured on the plate, should not be more popular amongst professional photographers. It may be that the manipulations, simple though they seem, have not been sufficiently clearly explained." [Rather an unkind cut that, is'nt it? Does it mean that the said "inventor" did not know his own process, or what?] "The results obtained by skilful operators have been very noteworthy; but it would be well to determine how long collodion thus sensitised would keep without deterioration." Yes! it might be, indeed; but it is rather late in the day to propose that preliminary step to public recognition when it is now thirteen years since this process was first laid before the public by M. Gaudin. It must have been a most melancholy failure—worse even than we had thought; so, poor touter! let it sleep on in the grave where "its merits" have laid it.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 742. Vol. XXI.—JULY 24, 1874.

SILVER RESIDUES.

If there be a subject in the photographic world that is perennial it is the subject of wastes. A great deal has been written upon this subject in a casual manner, and yet, like the *Ghost* in "Hamlet," this perturbed spirit is always appearing upon the scene of action when least expected. There are two causes for this restless condition of the photographic world. Firstly: there is the fact that the reclamation of photographic wastes is very troublesome, especially when dealing with paper clippings, &c., and the photographer will not, as a rule, be troubled with such processes as furnace reductions. Secondly: great uncertainty exists as regards the residues being fairly treated when sent to a professional reducer. In the interests of this very often maligned class of men we must say that we think, and have reason to know, that many of them err on the side of generosity, and that when errors creep in it has been in favour of the consignee of the residues; at least we know of such a case having recently occurred. In the reduction of the silver from old baths there is no excuse for the photographer making use of the professional reducer. Now, in the following article we intend to place all the available, but rather scattered, information at our disposal in a concise but, at the same time, collected form, and also give some statistical information which may be useful even to those who do not work their own residues.

In the first instance, we will consider the numerous plans that have been proposed to effect the reduction of silver from *solution*. Insoluble residues we will reserve for after-consideration. We are, therefore, to consider that all our silver is in the form of nitrate, with variable quantities of iodide, bromide, and, perhaps, chloride.

Most of the useful processes are based upon the electric affinities of the other metals for acidulous group or electro-negative elements with which the silver is combined. Thus to place a few of the metals which most interest us at present in the order of their electro-chemical affinities:—

Order of Displacement.

Electro-positive.—Potassium or sodium.
Magnesium.
Zinc.
Iron.
Copper.
Silver.
Platinum.
Electro-negative.—Gold.

So that we see that when combined with an acid which gives free vent to the chemical action, or such an one as forms soluble salts with all the metals engaged, zinc will displace copper from its combination, copper silver, and so on. Now for the various methods in use.

Reduction by Copper.—If copper be brought in contact with a solution of nitrate of silver the silver is deposited according to the following equation:—

$$\underset{\text{2 eq. nitrate of silver.}}{2\,(Ag\,NO_3)} + \underset{\text{Copper.}}{Cu} = \underset{\text{A molecule of silver.}}{Ag_2} + \underset{\text{Nitrate of copper.}}{Cu\,(NO_3)_2}$$

Each ounce of nitrate of silver will require about a quarter of an ounce of metallic copper. The precautions to be observed are the following:—The solution must not be too acid. If the solution of the silver salt contain an excess of acid a secondary action is set up between the copper and the free acid, and the resulting product is largely contaminated with oxide of copper; but if the pieces of copper be clean when put in, and if the solution of silver be neutral, the silver will be precipitated. The silver will be got in a beautifully pure and bright condition. The silver solution should not be too strong. After the copper is put in it should be left perfectly undisturbed for twenty-four hours. These precautions are of importance, because the silver will then be deposited in a light and semi-crystalline condition, which enables the operator to wash it with facility from the nitrate of copper.

The best form in which to use the copper is a massive bar; and the loss in weight which this copper undergoes after each operation will give a rough estimation of the amount of silver present in the solution, namely, one part of copper represents in round numbers three parts of silver. It is as 31·75 is to 108, so is a to x, a being the copper consumed. In some works we see that it is recommended that the bar of copper should be suspended at the top. Nothing can be more absurd, because the specific weight of the salt formed is actually lighter than the nitrate of silver; therefore, if the position of the bar of copper would facilitate the reaction, it should be placed at the bottom of the vessel, and as the reaction proceeded an upward current would take place.

The reduction of the bath by means of copper is one exceedingly easy of execution, and one of the most valuable in the hands of the photographer who wants to avoid furnace works. It is also the process best known, and therefore rarely fails, particularly if the precautions recommended in the above details be adhered to. It requires, also, no apparatus but what the photographer has at hand.

Reduction by Zinc.—It will be seen that the metal zinc bears in our table even a more electro-positive position in regard to the silver than the copper, and, as it is a cheaper metal, at first sight it would appear to be the correct process; but, unfortunately, it is next to impossible to get any sample of zinc that is not extremely impure—so impure, in fact, that it is really almost a practical prohibition. A quarter of an ounce of zinc represents about one ounce of nitrate of silver. There are certain conditions of the baths and other solutions containing organic matter in solution where the silver salt might be advantageously precipitated as chloride. Thus the now well-known De la Rue battery cell is formed merely upon this principle:—One element is a plate of zinc, the other is a plate of fused chloride of silver. The liquid used is a saturated solution of chloride of sodium, and when the connection is made a slow but continuous action sets in, which results in the production of metallic silver.

$$\underset{\text{Two molecules of chloride of silver.}}{2\,Ag\,Cl} + \underset{\text{Zinc.}}{Zn} = \underset{\text{Chloride of zinc.}}{Zn\,Cl_2} + \underset{\text{Silver.}}{Ag_2}$$

The zinc works very well in this process.

When chloride of silver is precipitated from a bath it is necessary to acidulate with hydrochloric acid, and when once the action sets in it progresses very regularly and perfectly. However, when the action takes place in a platinum dish, or when a small piece of platinum foil is put into the dish with the zinc, the reaction proceeds very rapidly. The *modus operandi* is as follows:—The bath should be precipitated with hydrochloric acid, and the resulting chloride washed, by decantation, two or three times. The piece of zinc and platinum are then added, and the whole gently acidulated with hydrochloric acid. Hydrogen is given off rapidly at the surface of the platinum. We need hardly remark that the platinum will last for ever, or, at least, during the life of the operator, providing he does not lose it; and we should recommend the use of a round-bottomed evaporating dish. The object of this precaution is, that small particles of the decomposing material are constantly being carried to the surface of the liquid by the evolved hydrogen; but in a vessel with a round surface they are always brought back to the zinc lying in the centre of the vessel, and, as we are dealing with an insoluble precipitate, actual contact is necessary. The reaction is very perfect, and when once set going requires no further attention. The action of zinc directly upon a nitrate bath does not result in so clean a precipitate of silver, although it is more energetic than the action of copper. As we wish to give the details of some further important processes not, perhaps, generally in use, we must reserve the continuation of this subject for a future article.

METROPOLITAN PHOTOGRAPHIC INDUSTRIES.

THE URANIUM DRY PLATE COMPANY.

The Uranium Dry-Plate Company has now attained the status of a large commercial undertaking. The manufacture of dry plates arose in consequence of the success which had attended Colonel Stuart Wortley's published formulæ for the use of bromide and other salts of silver in collodion containing nitrate of uranium. The factory adjoins Rosslyn House, the residence of Colonel Wortley, and, so far as we know, that gentleman is the moving and controlling power of the manufacture. With respect to the quality of the plates now issued by the Company we have recently expressed a very decided opinion; and after having witnessed the whole operation of preparing them, and the care taken at each successive stage, our high opinion of these plates is not likely to decrease.

In attempting to give a description of this establishment we first of all direct attention to the preparation of the pyroxyline. There is a glazed cupboard capable of holding a large glass jar, in which are placed the acids and the cotton to be converted into pyroxyline. In the interior are also a gas stove, a thermometer, and a porcelain spatula of the shape found best adapted for stirring up the cotton when placed in the acids. The operator inserts his arms through flexible sleeves, and there is a chimney on the opposite side by which all fumes and noxious gases are conveyed into the open air. By this arrangement the manufacture of pyroxyline is carried on without anything approaching to unhealthiness or even discomfort. It is made in batches of six ounces at a time.

As soon as the cotton has been immersed in the acids for the time determined by experience to be the best it is transferred to a washing trough, which we shall endeavour to describe. Imagine a vessel of a pyramidal shape with the apex lowermost, with a tube in the bottom (or apex) for the admission of water. This is the washing trough. Near the top is an outlet pipe; but interposed between the side in which is placed this pipe and the centre of the trough is a frame filled with two thicknesses of coarse muslin, fitted in such a way as neither to allow the outlet pipe to be choked on the one hand, nor on the other to allow a single filament of cotton to escape. As the water gurgles up from below the pyroxyline keeps bounding up and down, never being at rest for a single moment. In this way the acid is entirely removed from the cotton.

Ascending a flight of steps we were shown into the room in which the preparation of the plates was being conducted. It was very closely guarded by opaque curtains and doors so constructed as to preclude the possibility of any white light obtaining access. At first we imagined the light of the interior was too weak to admit of any operation being carried on requiring the use of the sense of sight; but when the eyes had become accustomed to the darkness, and the pupils became expanded, we were enabled to see everything with distinctness. The working light is, however, very weak and of a strong orange or ruby character. This the great sensitiveness of the collodion imperatively demands; for we need not here stay to remind the reader that bromide of silver is much more sensitive to coloured rays than the iodide of silver.

In this preparing-room are two large systems of cupboards arranged for the different sizes of the plates which are being prepared. One of them is placed at one side, and holds the plates which have been cleaned and coated with substratum, and are thus ready for being collodionised. The other is for drying, or rather for desiccating, the plates after they are coated. There is also a draining arrangement, the use of which will be seen as we proceed. The cupboards are heated by means of hot water pipes, which come from a boiler situated in another place, and which is heated by gas jets.

The portable racks in which the plates are kept are very handy. They consist of a kind of skeleton box—that is, the frame-work of a box without sides, ends, or bottom. The inside of the upper side bars forming this skeleton box are grooved to receive plates which rest in V-shaped grooves in the bottom bars. The whole is constructed in such a manner as to prevent the face of the plate from having to touch anything.

Sitting with a rack full of plates before him, a man attaches an india-rubber pneumatic holder to one, and from a bottle of collodion emulsion he pours on sufficient to coat it. We were struck by the skill, arising from practice, displayed by this person; for so accurately did he estimate the precise quantity required for coating the plate that very little indeed had to be poured off by way of overplus. This overplus, however, is not poured into the coating bottle, but into a filter, so as to ensure the rejection of any deleterious matter with which it may have come in contact. Of course the loss from evaporation is made up by the addition of ether and alcohol.

As soon as the plate is coated and the superfluous emulsion poured off it is then reared up at the side of the operator, from which place it is taken by a girl, who, armed with a pair of silver hooks, dexterously snatches up the plate and immerses it in a vessel of distilled water; and during the time the girl is doing this the operator is engaged in coating another plate. After washing the plate in one vessel until the surface is freed from greasiness the girl removes it to a second vessel of distilled water, where the washing is continued, and after a final rinse under a tap of distilled water contained in a glass barrel she deposits the plate in a place where it is drained. From this position it is removed by another girl, who, also by means of silver hooks, lifts it up and places it in the preservative dish. The duties of the latter girl are confined to placing them in and removing them from the preservative solution, each plate on removal being transferred to the draining shelves, in which they remain till the following morning, when they are removed to the hot or desiccating cupboard.

Colonel Wortley considers it of the highest importance that the plates should be allowed to become quite dry, in the ordinary sense of the word, before being transferred to the heated chamber, where they are thoroughly desiccated by the agency of a high temperature. In this heated chamber the plates remain for twenty-four hours, and are then taken from it to be immediately packed in those orange and black papers now so well known to workers with uranium dry plates. We may here add that by the division of labour in the preparation of plates it is obvious that the maximum of cleanliness and mechanical perfection will be secured.

The plates, when finished, are subjected to a rigid examination, and those not coming up to the standard of uniformity adopted are at once rejected.

Test plates also are prepared each day—two at the beginning and two others at the end of the day's work—and these are exposed and developed the following morning, in order to ascertain that no change has taken place in the chemicals during the day while the preparation has been going on.

The number of plates prepared in a day is from fifteen to twenty dozen. They are of various sizes, according to the demand; but in some instances one dozen of prepared plates represent in reality from two to four dozen; for, as may have been anticipated, small plates are not prepared specifically, but in plates of twice or four times their dimensions. For example: three 10 × 8 plates, when divided into four, each make a dozen 5 × 4 plates, or half-a-dozen 8 × 5 size. From thirty-six to forty-two dozen plates are thus the number turned out in an average day's work, after taking into account the rejection of faulty plates.

As respects the preparation of the emulsion a large batch is made by Colonel Wortley once a week, in quantities of from one to two gallons, according to the time of the year and the demand; and there is always a supply of emulsion respectively one, two, and three weeks' old, the mixture of which in suitable proportions gives a working emulsion, possessing all the properties required, on the day of preparation.

From some observations elsewhere made by Mr. Sutton we imagine his recently-expressed opinions respecting the exceptional merits of lenses of which the back and front are absolutely similar are undergoing modification. We have never considered it worth while to go very deeply into the subject of the symmetry or non-symmetry of lenses; but we may here take occasion to say that of these respective classes of lenses which is to be considered best depends upon the special circumstances of each case. As a copying lens for producing images absolutely free from distortion, and of the same size as the original, the lens or combination must be quite symmetrical; but, in proportion as the relative conjugate foci of the lens are altered by the production of an image of larger or smaller proportions than the original, so must the lens, when mathematical accuracy is required, be made to deviate from its symmetry. The relative size of the object to be copied and the copy being altered, the curves of the lens must be varied. Theoretical accuracy would seem to demand that the lens of a combination nearest to the farther of the conjugate foci must be of longer focus than that next to the shorter conjugate. We shall not at present enter further on this subject, but proceed to remark that combinations such as those desired by M. Davanne, and now suggested by Mr. Sutton, have for several years been accessible to purchasers. A considerable period has elapsed since we described Darlot's casket of lenses, in which, with one mount, a variety of lenses were adaptable, and could be used either as doublets or as single landscape lenses. The extinct American "ratio lens," also, was one of this description; and at the present time lenses of similar capabilities, manufactured by Zentmayer, of Philadelphia, are used in the United States of America. The non-symmetrical principle is in all these so fully recognised that the depth of each cell is determined by the focus of the lens set therein; and hence any mistake in the use and adjustment of them is rendered impossible.

PHOTOGRAPHIC PLAGIARISM.

Some reference has been lately made in the photographic journals to Dr. Hermann Halleur and his publications on the subject of printing processes without silver nitrate. I happen to have his treatise on photography (in which the above-mentioned experiments appear) in the form of an English translation by G. L. Strauss. The book is not a creditable one. In fact, with perhaps a single exception, it is the most outrageous piece of photographic plagiarism I have ever met with. Whole pages are taken from Robert Hunt without the slightest acknowledgment—sometimes with slight alterations, oftener with no more change than would naturally result from translation into German and retranslation into English. Not merely is the experimental portion largely taken from Mr. Hunt, but even the historical introduction bears evident marks of the same origin.

To make the truth of this matter evident I have put into parallel columns a specimen taken almost at random. The subject is the well-known experiment of exposing silver chloride paper to light till it darkens, then applying potassium iodide, after which light exerts a bleaching influence:—

"It is indispensable to perform this operation in the unclouded light of the sun, since, strange though it may appear, it is no less true that clouds which may happen to obscure that luminary are faithfully, though very faintly, reproduced on the paper, and make their appearance in the next operation.

"When you want to make use of the paper so prepared you must imbue it with solution of iodide of potassium, and expose it wet in the camera. The proper proportion in which the iodide of potassium should be used has not been definitely settled, though thirty grains of pure salt to an ounce of water would appear to answer best; this is a question of great nicety, however, as a few grains more or less make a great difference in the result.

"*For my own part I should prefer* iodide of barium to iodide of potassium, taking care to remove previously some of the barium with one or two drops of diluted sulphuric acid, or sulphate of baryta."—H. Halleur, *Art of Photography*, p. 51.

"The morning sun should be chosen, and a perfectly cloudless sky, if possible. It may appear unlikely, but nothing is really more true, than that these papers indicate to the practised eye, during the bleaching operation, the effects of every cloud that has obscured the sun's disc during the darkening process.

"To use the papers thus prepared, it is required that they should be washed over with some iodide and exposed to the sun's influence wet. The iodide of potassium, being the salt which is most easily obtained, will be generally preferred. It is very difficult to decide on the best proportions in which this salt should be used, the difference of a few grains only wonderfully altering the result; in general, about thirty grains of a pure salt to one ounce of water will be found to produce the best effect.

"For the camera obscura I would recommend the use of the iodide of barium beyond every other preparation; and if by throwing down some of the baryta by a drop or two of dilute sulphuric acid," &c.—Hunt, *Researches on Light*, 2nd edition, pp. 96-7.

With the best disposition to be charitable it would be impossible to look upon this otherwise than as a piece of deliberate stealing. The expression which I have put into italics—"for my own part I should prefer," &c.—deserves to be ranked as one of the curiosities of plagiarism; I do not see how it could be exceeded in its cool way of appropriating another's ideas. In the last clause of the sentence we do get an original idea of the author's; the ass's ear comes out.

Not only is the whole book pretty much a literary theft, but the disposition exhibited by the above italicised passage constantly reappears. Speaking of silver chloride, he says:—

"*In my own experiments I prepared* a number of papers, all of them differing in the chemical proportions of the agent used. I cut off a small piece of each, putting corresponding numbers on the papers and the samples cut off, and placed the latter in a faint diffused light. I then selected the papers for use the samples of which had suffered the greatest change of colour."—Halleur, p. 41.

"Having, therefore, prepared a number of sheets of paper with chemical proportions slightly differing from one another, let a piece be cut from each, and, having been duly marked or numbered, let them be placed side by side in a very weak diffused light for a quarter of an hour. Then if any one of them, as frequently happens, exhibits a marked advantage over its competitors I select," &c.—Hunt, p. 65.

The above is from Mr. Fox Talbot, quoted by Mr. Hunt. Dr. Halleur is not particular, however, from whom he appropriates. It should be clearly understood that both the above extracts refer to one and the same process, the details of which are all copied closely by Halleur, slightly paraphrased, but essentially identical.

At the bottom of the same page as the above our plagiarist says:—

"*I would recommend* the following proportions of chloride of sodium and nitrate of silver to prepare a paper suited to receive impressions in the camera."

Then follow the directions, agreeing to the smallest details, which Mr. Hunt has given at page 66 for *positive printing*. So that Dr. Halleur has here copied rather carelessly, though he has made the appropriation complete by using the words I have italicised, intended to indicate that the formula has sprung entirely from his own researches. This blunder of taking a formula for positive paper and recommending it for attaining negatives in the camera may fairly be put alongside of the other in which he recommends the precipitation of barium sulphate by barium sulphate.

It seems, however, useless to multiply parallel passages. An entire number of this Journal could easily be filled with them if it were worth while. In fact, the whole book is a parallel passage.

I have looked in vain through the book for anything like an acknowledgment to Mr. Hunt for these extensive appropriations, but can find none; so that the whole thing takes the shape of a graceless, shameless fraud, committed, as is indicated by special expressions of appropriation, intentionally and with malice aforethought.

M. Carey Lea.

ON THE CONTRACTION OF COLLODION FILMS.

Photographers have all, through a more or less severe experience, come to know what it is for the films of their negatives to contract and expand. Sometimes their films will visibly draw together as they dry, and, should the film be brittle or weak, crack, and fly piecemeal off the glass. At other times damp will get at them through the varnish, in consequence either of careless storage or the film being left round the edges of the plate to form a vehicle for the conveyance of moisture inwards, and then the film will push the varnish up in ridges and lines all over the glass, producing hopeless cracking. These greater evils can to some extent be guarded against. The plates may be coated beforehand with some more adhesive substance than collodion, and reasonable care may be shown in storage; but that is not now all that is wanted.

Photography is becoming everyday more recognised as the handmaid of science, and by its help the most refined and delicate observations are registered. On what it records the most abstruse and far-reaching calculations are based, so that the minute alterations which take place in a photographic image through the changes in its condition have become of an importance altogether beyond the demands of the ordinary commercial photographer.

As everybody knows, collodion films do change. A film is not the same when wet as when dry; it settles down and contracts, and if it be of uneven quality its contraction will be also unequal. And if a film once dry is not susceptible to very much change, still it may be so to an extent sufficient to throw out calculations such as those, for instance, which will be based upon the photographic registrations of Venus's place on the sun's disc next December. It will be obvious to anyone that when the vast distance between the sun and the earth is considered any such difference in the apparent position of Venus as will be obtained by observers stationed at the most northern and southern stations respectively on the earth cannot be very striking. It will be little more than what one gets by looking through a tree at, say, a spire or a house some distance away first with one eye and then the other. Even the slightest aberration in the photographic register of this difference would suffice to damage the astronomical reckoning, and this being so the perfect stability of the photographic plate is a matter of the highest importance; either that, or the laws of aberration for given kinds of films should be accurately determined. And considering the extreme delicacy of the work to be done it is probably a very wise resolve which has led to so large an adoption of dry plates for taking the observations. A few years ago—nay, more recently than that—but for Colonel Stuart Wortley and his *collaborateurs* such adoption would have been impossible.

Some interesting experiments have recently been made with a view to ascertaining the variability of films, and with results so conflicting that the conclusion is inevitably come to that collodions differ in their contractile capacity amongst each other. Thus, Herr Paschen determined their contractability at $\frac{1}{300}$, and Mr. Rutherfurd, on the other hand, placed it so low as $\frac{1}{2400}$—very important differences.

The subject has attracted the attention of that *habile experimenteur*, Dr. Vogel, of Berlin, and he has lately published some remarks upon the matter which, if not settling the subject, at least afford *primâ facie* evidence that the danger exists, and that scientific men must be prepared to guard against it, and to take it into account if they are to make their photographic observations perfectly trustworthy. The first thing that Dr. Vogel established was that, as the discrepancies quoted above tend to show, collodions differ greatly in their contractile tendency. He tried samples of collodions made in Berlin, St. Petersburg, and Paris, and found that they all gave different results. The first crude experiments were with wet films dried in the ordinary way, and, of course, these showed a great difference—the film when wet quite overlapping the glass, as it were, and when dry showing that it had considerably receded.

A more delicate experiment was tried by Dr. Vogel when he took a long strip of glass (110 centimetres—a quite unnecessary length) and marked on it with a diamond rectangular strokes. Under this scratched glass plate were exposed wet films by placing the marked strip right over them with an edging of thin writing-paper between to keep them from contact, and which was not sufficient to prevent perfect sharpness. It is, however, advisable before doing this to let the plates drain some four or five minutes. No more lighting is needed than can be got by a momentary opening and shutting of the window of the dark room while the plate is kept in a perpendicular position about ten feet therefrom, but parallel to the light. Development was accomplished by any of the three leading methods—iron, pyrogallic, and the alkaline developer (the last with dry plates, of course)—and the fixing was by either hyposulphite of soda or cyanide of potassium. To test the contraction of the film all that was needful was to place the plate and the gauge in juxtaposition when the former was dry. They were easily adjusted by getting the print of a scratch and its original to cover each other, and then to inspect the two by transmitted light. If any distortion had taken place the two sets of lines would not, of course, coincide. The amount of variation could easily be measured by placing the plates under a microscope—one-fiftieth of a millimetre being thus measurable. From this the total aberration could be ascertained. For instance: if the scratch and its print at one end of the plate be laid together, and if the opposite or further margin be ninety millimetres from that end, while one-fiftieth millimetre is the contraction of the collodion line, as shown by the projection of the original scratch, then the contraction will be expressed thus:— $= \frac{1}{50} : 90 = \frac{1}{4500}$.

With the first trials a thick, tough collodion was used, and the result gave striking contractions of the film, and it was at once laid aside. A Russian and a German collodion were then tried, and a collodion was prepared for testing purposes, the details of which are quite superfluous, for the general result appeared to be that a collodion was contractile or the reverse according as it did not stick or as it adhered to the glass. As soon as the film had been loosened by washing from the edge of the glass, or so soon as water had got between the two, contraction took place. These dangers, therefore, should be guarded against; and in Dr. Vogel's esteem they may be so by a preliminary coating of the plate, or, at least, by running a brush with india-rubber solution round the edges.

Of five plates prepared none of them could be said to have yielded any definite results. No. 1 showed irregularity in the setting of the film, and one or two of the others revealed minute tendencies towards contraction, particularly towards the thick side of the film; but other collodions gave, as far as we can judge, absolute stability. The collodions were all German. Apparently, therefore, a description of their qualities would not help us much, although, we think, a clever chemist in this country might be able to draw some useful data, lessons, and warnings from an analogous "proving" of those made at home.

Regarding dry plates the testimony appears to be conflicting. Naturally one supposes that the greatest contraction having taken place before the plates are used any change that comes after can be of little moment; but this does not always appear to be the case. Of two plates developed—the one with alkali and the other with acid—the acid-treated one gave way at the edges and left the glass, so that on being re-dried it showed the enormous contraction of $\frac{1}{50}$. This is in accordance so far with the received notion in wet-plate photography—that prolonged treatment with the acid developer has the effect of heightening the contractile tendency of the film. In the alkaline-developed plate, on the other hand, there was no sign of contraction at all. So far with plates of the ordinary bromide-of-silver kind made with Mann's collodion.

But the gummed bromide plates of Colonel Wortley behaved in quite another fashion. These showed contraction, with a tendency in the film to rise—a fact which the experimentalist triumphantly records as in favour of his own plates. This is quite a pardonable thing, but the data he advances are by no means sufficient to warrant any broad conclusion. If stability be wanted plates should never be coated with gelatine or gum, he says; but he confesses that the delicate handling which bromide-of-silver plates require leaves the question as yet by no means determined.

The next experiment was with the morphine process—one of extreme simplicity, wanting nothing that is not used for wet plates except morphine. Of this he applied, after the plates had been prepared, an exceedingly thin solution—one part of morphine to 1750. The results of this process do not appear to have been ascertained in quite the same way as the others; but it is Dr. Vogel's conclusion that this process will give a more sure result than any other in solar photography. In this direction he appears to have tried it, but rather for its sensitiveness than with a view to see whether the preservative exercises any perceptible effect upon the expansive power of the film. We do not propose to follow him into these experiments; for by this time probably every one concerned will have determined the process he means to use at the transit, and, at anyrate, the discussion of its general merits is foreign to the subject of this paper.

That subject, we repeat, is one of no small scientific interest, and one, therefore, well worth determining; and if the notes above given cannot be said in any sense to determine it, they at least afford a hint of the method by which such a work could be done. We may say that it is not in the direction of what this man's collodion and that man's process does that the true data are to be found. All collodions and all processes will be found to vary their phenomena very widely at different times and in different hands; and therefore, in order to get at some general law, experiments must be undertaken over a very much wider range than anything we have here. In all probability it will be found that with most dry processes the aberrations are extremely slight when they are worked under normal conditions; and if so, the boon that alkaline development will prove to scientific research, by enabling these to be used therein, cannot be over-estimated.

ON BROMIDE EMULSION MAKING.

My readers, no doubt, are all aware that a sensitive emulsion which, "with indefinite keeping qualities, requires neither preservative nor washing," is now manufactured for sale.

If we ask what advantages a collodio-bromide emulsion such as that now advertised is likely to offer as compared with the common methods of preparing sensitive films, wet or dry, with a nitrate bath, and what are likely to be its drawbacks, the *pros* and *cons* may, I think, be stated thus:—The main advantages will be uniformity in the films, and development with clean fingers. The minor advantages are simplicity in their preparation, and the absence of a nitrate bath.

On the other hand, it must be remembered that in using an emulsion it is necessary to shake the mixture before pouring it upon the plate, and that this must increase the liability to specks in the film. In the common collodion process with a bath a special kind of collodion-pouring bottle is used, which allows the particles of dust in the collodion which come off the plate, and which flow back into the bottle, to fall through a small hole into an outer vessel, and so not to affect the films; but no such arrangement seems to be possible with an emulsion bottle. It follows, therefore, that when an emulsion is used *extraordinary* precautions will be necessary in order to prevent dust specks upon the films. This is an evil of the *first* magnitude as regards the application of an emulsion process to *portraiture*. Then, again, it is doubtful whether an emulsion possessing good keeping properties will ever give films which are sufficiently rapid for portrait negatives having good printing density.

If these objections should have any weight in practice, the use of such an emulsion as we are now discussing will be confined to slow out-of-door subjects, in which a few specks on the film do not greatly matter. We all know that in landscape scenery of a wild and romantic character skies can often be blacked out, and natural skies be printed in or suggested by shading; whilst specks amongst rocks and foliage can easily be "retouched" both in the negative and the print.

Taking, therefore, the *least* favourable view of the matter, it appears that such an emulsion as is now advertised must have great value for amateur landscape photographers, and its introduction may be the means, probably, of greatly popularising our art. I have in my mind's eye at this moment many a young friend, both male and female, who would be delighted with the prospect of photography thus simplified and worked with comparative cleanliness—to say nothing of their seniors, many of whom would be as delighted as the juveniles with photography made easy; and, therefore, although there may be Gordons and Bedfords and Silvys amongst us who would deem the advantages of the emulsion process more than counterbalanced by its objectionable features, still for the mass of amateurs the process may have attractions and become popular. It is quite worth while, therefore, to discuss the problem of collodio-bromide emulsion making, so far as it relates to slow out-of-door work, done in a sure, clean, and simple manner.

The principle of a slow bromide film for common landscape work seems to be this:—It must contain bromide of silver, *plus* unconverted soluble bromide, *plus* organic matter of a kind which is active in its reaction with silver salts.

The plan of adding an alcoholic solution of silver nitrate to bromised collodion can never, as it seems to me, lead to a permanently good emulsion, such as we are now considering, which requires no washing, or preservative, for these reasons:—First: on account of the viscidity of the collodion, it will always be uncertain how much soluble bromide or silver nitrate may remain unconverted in the emulsion. Secondly: it will be unsafe to add active organic matter to an emulsion of such uncertain composition. Thirdly: the emulsion will contain a large and injurious quantity of nitrate of cadmium.

These difficulties lead us to the consideration of Mr. Bolton's plan, which consists in pouring the emulsion of uncertain composition into water, and thus recovering all the free soluble salts; then redissolving the precipitate, and adding the organic matter. If this plan were practised on a large scale, for a commercial purpose, the ether and alcohol could be recovered from the water by distillation, and the practical objections to the method would be unworthy of serious consideration.

Lastly: we have another method open to us, viz., that of grinding pure dry bromide of silver into a paste with a suitable kind of organic matter, and adding this to plain collodion containing a trace of a soluble bromide.

I have proved that most of the pigments used by artists, when ground with oil (as sold in metal tubes), will emulsify easily and perfectly with collodion. It is very probable, therefore, that such an emulsion as we are now considering could be made on the same principle. It will not do, of course, merely to add the dry bromide of silver to the collodion, and then shake the mixture; that is certain to end in failure. The bromide must be mechanically ground up and mixed with some suitable kind of organic matter, in a state similar to oil, before it is added to the collodion; and how to do this properly is just the problem to solve.

The sooner we get rid of the old-fashioned plan of mixing the soluble bromide and the nitrate of silver together in the collodion, and then washing and organifying the film, the better; for nothing that is really convenient or progressive has come of that method. If dry plates are to be prepared by washing and organifying the film the method with the bath is far simpler, in my humble opinion, and more satisfactory than the above.

Perhaps the best mode of proceeding, according to the old principle of mixing the ingredients, is that of Mr. Stillman, in which he first adds an excess of silver nitrate, and leaves the emulsion for weeks or months until all the soluble bromide is converted, then adds some bromised collodion in order to convert the excess of silver nitrate, and washes and organifies the film. At anyrate, this is the plan which has answered best in my hands.

When Colonel Stuart Wortley kindly publishes his latest improvement, by means of which he secures exalted sensitiveness along with printing density in an emulsion film, we shall be in a better position to discuss the theory of the peculiar action of restraining bromide and organic matter.

Great credit is due to Mr. Bolton, Mr. King, and Mr. Kennett for the part which they have played in introducing the new methods of emulsion making, by which all free soluble salts may be eliminated. The great sensitiveness of Mr. Kennett's gelatino-pellicle is also a highly-interesting fact, though no more than I was quite prepared to expect from his process, which I sincerely hope may find some valuable practical applications; but the worst of gelatine is the slowness with which it sets and dries.

In reviewing the entire history of bromide emulsions it is satisfactory to find real progress made in their manufacture, and a right principle of preceeding at length established; and even if some few experimentalists have persistently worked in a wrong direction that has been useful in teaching us what to avoid in future.

Thomas Sutton, B.A.

NEÔLEO-PEINTURE.

We have of late received some very interesting information through the medium of this Journal about *neôleo-peinture*. It might be, therefore, interesting to some of your readers to hear a little more of these really very beautiful pictures and their history.

As far as I can remember it was early in the year 1866 when a traveller from America or Australia came over to this colony exhibiting a coloured picture by a similar process called "senotype." I had no opportunity of seeing the party nor the pictures myself till after the latter had made their appearance some time in public. Those I saw were really very beautiful, soft pictures, possessing great relief. I was told that a sum of £100 was paid by three different photographers for the secret.

At about the same time a number of this Journal came to hand, giving some hints on the subject, by directing to mount two photographs on glass which had been previously made transparent by a varnish, and after they had been coloured at the back of the picture were cemented together. After experimenting for about two months, trying different transparent varnishes, I found that the greatest secret of the process was in the way of mounting the photograph on the glass so that it should preserve its transparency.

Turpentine copal varnish seemed to me the best; and I find that the pictures have kept well after a period of eight years. The only drawback I have noticed has been that some turned slightly yellow, which, I dare say, might be occasioned by the imperfect white oil colour I had to use.

I proceed in the following manner:—Three prints on thin plain Saxe paper are taken, toned and fixed in the ordinary way, and one rather dark is printed to serve as a guide when colouring. A patent plate glass, 12 × 10, is scrupulously cleaned, and copal varnish of the thickness of collodion is poured on the plate in the same way as a plate is coated with collodion, without allowing the surplus to run off. On this the print is laid in the way the paper is usually floated on the printing bath, face towards the glass. Now lay the glass on a levelling-stand, and let the whole rest till the next morning. By this time the varnish has soaked through the paper, rendering the same transparent; the varnish underneath the paper has got tacky. Now proceed to remove, with a bone paper-knife, all lumps of varnish, avoiding air-bubbles by going gently with the knife over the back. Use a little raw linseed oil to remove the varnish from the back, and be careful not to press too much varnish out from underneath. A little practice will soon show what is necessary to leave to keep the transparency, otherwise it will cause bright spots on the glass. Do it gently, and from time to time.

When dry, colour the back with transparent oil colours; lay a piece of white paper under the glass when colouring, to throw out the colour. A second print is mounted on a thick piece of white cardboard, in such a way that both pictures will match exactly when the front picture is laid upon it. The back picture is now thickly coloured with oil colour, carefully keeping in the contour, and, when finished and dry, both pictures are cemented together. But allow a space of one-sixteenth of an inch between them by pasting a strip of cardboard about a quarter of an inch wide all round. This has the effect of making the figure stand out of the background, softens its tone, and prevents rubbing or sticking together. The picture is now ready for framing. CARL BLUHM.

King William's Town, Cape Colony,
June, 1874.

FURTHER MEMORANDA ON M. DUCOS DU HAURON'S PROCESS.

We recently gave some indications of the line upon which this process runs, which showed that it was of quite a distinct type from either that of M. Léon Vidal or M. de Sainte Florent. He professes his ability to take negative impressions of the distinct primary tints which, combined, form the colours of a figure or landscape; and, shadowy as the prospect of any definite success in that form seems, his experience is worth recording. A late number of the *Moniteur* contains a further instalment of his memoranda on the subject, which we accordingly, in condensed form, proceed to lay before our readers.

Dr. Vogel, he remarks, has succeeded, by dissolving the red colouring matter known as coralline in bromised collodion, in making this collodion as sensitive to the yellow ray of the spectrum as to the indigo, and believes that by adding different colouring substances to the collodion in the same this uniformity of sensitiveness might reach the whole range. M. Ducos was much struck with this observation, and was curious to know whether or not this coralline collodion was susceptible of giving images in a red light and in shorter time than the resinised bromised collodion with which he had been experimenting. A trial convinced him that the former was much the quicker of the two, and then he thought he would try the effect of the same substance in iodised collodion. He did so with the happiest results; it is, in fact, more rapid than the bromised. With it he can get an image of a landscape through red light in the camera, with a doublet of medium rapidity, in about twenty-five or thirty minutes in the sunlight. With green light the same substance will give an image in two or three minutes; with a blue light the time varies from instantaniety to one or two seconds, according as the colouring is deep or not on the glass.

Further: it has been ascertained by M. Ducos that iodide of silver gives a different rendering of certain colours into the blacks or shadows, according as a green or violet medium is employed—a fact he esteems of high importance in heliochromy—and in this respect it is superior to bromide of silver. The latter, employed alone, gives a negative with a green glass wherein the red objects are not sufficiently feebly represented; and with a violet glass a negative, on the other hand, in which yellow objects are a trifle too much effaced. This apparent anomaly proves that bromide is too sensitive to certain rays which enter into the composition of green and violet glasses, of which the action is intensified by other rays in the spectrum. Four parts of iodide and one of bromide do very well, and that is the proportion he uses accordingly.

Such being the case, it remains to describe the *modus operandi*, which M. Ducos says are so simple that any passable photographer may convince himself in twenty-four hours that heliochromy is a reality. This is demonstrated in describing the method by which three heliochromatic negatives were obtained by him. For each of these three negatives the same collodion, containing four parts of iodide to one of bromide, was used, and to every four ounces of collodion was added an ounce and a-quarter of red coralline, soluble in alcohol. The three glasses are sensitised in the same way; or, if a camera with three lenses be used, one glass will do. The plate may be prepared for either dry or wet working.

By the wet method a neutral bath is used, the plate is drained and put in the dark slide just behind the coloured glass to be used for regulating the character of the image. The coloured glass should fit close, as it thereby helps to retain the sensitive plate moist during exposure. When the weather is cold a veil of moisture, gathering into drops, is apt to form on this glass, thereby spoiling the sharpness of the image. To obviate this the glass is coated with plain collodion, which does not suffer the damp to make beads or to form a veil. The free silver is kept on the plate to prevent loss of sensitiveness; hence the necessity of keeping the plate from drying at all during the long exposure. Hygroscopic preservers — such as a mixture of glycerine and albumen—do not work very well; and M. Ducos does not know of any others, and has no leisure to find them out. The negatives are developed, as usual, with iron and pyrogallic acid; and it is well, if they have been kept long between sensitising and exposing, to redip them in the silver bath. When developed and fixed the plate is put up to dry, after having been coated with this mixture:—Water, one hundred parts; glycerine, four parts; albumen, twenty-five parts. Being dried in this condition the next thing is to remove the red coralline, and for this purpose the negative is washed over the surface several times with alcohol of about 36°, poured from a measure. This alcohol does the double duty of dissolving the coralline and coagulating the albumen, thereby solidifying the image.

When operating with dry plates it is necessary to add copaline resin to the collodion and coralline, in the proportion of two or three drachms to the four ounces. Another matter of importance is that distilled water must be used *exclusively* for washing the plates after sensitising, for this reason—that the slightest trace of calcareous salt prevents the red rays from forming a latent image. Even with rain water M. Ducos had failed to get anything but the feeblest imprint of the blue objects in the picture. And he asks whether the energetic action which the alkaline salts exercise on the salts of silver—an action which appears opposed to all reducing action of red light—might not be made available for obtaining *positive* images by transmitted light, in the camera, for purposes of heliochromy? The idea has struck him, and he will have more to say on it.

Thus far the present instalment of M. Ducos du Hauron's paper carries us. We regret that we must postpone further details of what must prove the most interesting part of his process to a future occasion. The system of publishing memoranda of this kind in fragments separated from each other by no law but that which the exigencies of "making up" dictates is not a good one, we are aware; but the *Moniteur* cannot well do otherwise, and we must make the best of it.

REMARKS ON CARBON PRINTING.

That the tide of "permanent photography" has fairly set in no one can doubt who watches the signs of the times, or even whose acquaintance with literature is confined to the pages of The British Journal of Photography; for its indefatigable Editors keep us fairly abreast of the current, and leave no stone unturned that can aid the progress of the art-science. Whether silver printing is to be swamped entirely remains for the future to reveal. Sooner or later, if the processes in whose inception such perseverance and vigour have been shown continue to improve at their present rapid rate, it must succumb; but much must yet be done to bring permanent photography within the reach of the everyday wants of photographers. I can fearlessly assert that, for portrait photography, no process yet invented can *equal* a first-class silver print on albumenised paper; but the race is very close.

For practical use in ordinary studio work the autotype process offers the greatest facilities, and it is the purpose of this article to jot down a few hints and details of working which shall render its use more easy to those who may hitherto have been frightened at a first attempt, or who may not yet even have given it a trial; for there is not a doubt that, at the present time, a remarkably small number of photographers give carbon printing a place in their printing-room. And there is an excellent reason for it—a very large majority of photographers make their income entirely from *cartes de visite*, and it is just in such small, delicate work that the unquestionable beauties of the carbon print show to least advantage. Hence we see that the process is more especially likely to recommend itself to the notice of those who do coloured work and large work, or, at anyrate, enlargements of some size.

For book illustration and similar purposes the working of this and the other permanent processes is practically confined to the various owners of the patents. But the nearer the processes reach perfection the more desirable is it that their practice should spread amongst the body of photographers, instead of being relegated to a few monster companies—a state of things which would result in the establishment of an intolerable monopoly. This consideration makes me the readier to add my mite to the universal store of knowledge. A letter in the issue of this Journal for June 12th gives a series of most pertinent questions, to which I shall at the outset set myself to reply, referring my readers to page 286, where they are stated at length.

Query 1. Blisters seen on removing the back of tissue.—These may be caused—First, by bubbles within the tissue as sent out by maker; this is not a common cause. Second, by bubbles left between the tissue and the paper after it is mounted ready for developing. Third, by minute solid impurities floating in the water while the tissue is being mounted. Fourth, by small pieces of insoluble matter, agglomerations of the pigment, &c., &c., on the front surface of the tissue when made, the result being that it breaks there and water filters through the small hole, loosening and raising the tissue about it while, possibly, the hole closes of itself again from its inherent glutinosity. Fifth, by excessive heat in the developing water. If the blisters occur so very freely and so frequently I should be inclined to put it down to the fifth cause. The water should be of such temperature that the hand can bear it freely.

Query 2. Difficulty in obtaining adherence of the tissue to the transfer paper.—This is caused—First, by the print being allowed to remain too long in the water before attaching it; when this has happened it will curl away most persistently. Second, the tissue has become insoluble from either long keeping or from being exposed to injurious fumes (dark-room vapours in particular). Third, and most probable, the tissue may be over-printed. Fourth, the pigment paper may have been sensitised in a bath made from a very acid sample of bichromate.

Query 3. The tissue leaving the support during developing.—The answer to Query 2 will, in most cases, serve to indicate the cause of this difficulty. It may also arise from the negative not having been printed with a "safe edge"—that is, a piece of semi-opaque paper pasted all round the negative—so that the tissue there will print of a light grey colour. It may here be mentioned that if a piece of tissue were exposed to the light (without any negative) so as to print of a uniform grey it would stick most firmly; while if it were exposed long enough to print of a uniform black colour (meaning, of course, black when developed) it would be next to impossible to get it attached at all to the support, be it either paper, glass, or zinc.

Query 4. Is the flexible support more liable than the rigid to these failures?—No.

"Carbon" has exhausted most of the common causes of failure in his queries. One other common mishap is a general unevenness in the depth of the finished picture; this is caused by unequal drying and by unequal penetration of the sensitiser again. The whole tissue will seem not to act at all; it is quite insoluble. Causes: very impure and acid bichromate in the sensitising bath; too long keeping; over-exposure.

Here it will not be out of place to mention the time of exposure. With different tissues it varies enormously, some being so rapid that on an ordinary day one can hardly put the negatives out for a sufficiently short time, while other samples will take half as long as a silver print would do. An average time is a fourth or a third of the time necessary to print a silver print.

Let me beg those of my readers who have thought of trying the process not to be frightened by thoughts of "*actinometers;*" nothing is better than to print a "pilot" print from any weak negative on silver paper at the same time the carbon is exposed. When the "pilot" is half printed turn down the tissue-frame and then see what it is like when developed. If not quite the right depth the proper exposure will be easily attained with the next piece, noticing the "pilot," and stopping the tissue printing when the former is either darker or lighter as the first-developed print pointed out was desirable.

I have noticed beside the common failures other cases which have occurred with me. If any other troubled correspondent lay his griefs bare in your Journal I will do my best to assuage them. Some further remarks about other aspects of carbon printing shall form the subject of another article, this one being already quite as long as is desirable.

G. Watmough Webster, F.C.S.

TURPENTINE IN NEGATIVE VARNISH.

There are few things practically more important than a good negative varnish—a varnish that shall be hard and yet not brittle, tough and yet not tacky, capable of standing great heat without becoming pulverised, and also great cold or damp without being affected thereby. And such a varnish, amid all the varieties that we have, is as yet by no means common. The extensive employment of methylated alcohol has, we believe, had a deteriorating effect upon some kinds of varnish. It is undoubtedly true that shellac varnishes made with that deteriorated compound do not endure like that made of the same gum with a pure spirit. The shellac so dissolved pulverises in heat and crumbles away; it is, in fact, more granulated in its deposit than it ought to be, and this, we suspect, has, more or less, been the case in not a few other instances. There are many varnishes which do duty admirably for plates that the photographer does not want to keep, but only here and there one to which a photographer dare trust the strain of popular plates constantly in use.

And there is another aspect of varnishes which is too often overlooked, namely, their singular influence upon the character of a picture. It is altogether a mistake to suppose that a varnish has no influence upon the details of a negative, for the reverse is the fact. A very clear, transparent varnish has a strong tendency to make delicate details too transparent for printing purposes; and a varnish of strong colour, with the gums in that fine state of division which the use of a pure alcohol unquestionably tends to promote, on the other hand, may so strengthen the weaker details that they will become unduly prominent and produce flatness. This will be especially so in cases where the film has been weakened and rendered porous by prolonged strain under the developer. But in any case the effects will follow this law; and so much so that a change in the sort of varnish used will, if other qualities be only equal, often be a most judicious aid to the good qualities of a negative. There are, too, photographers whose habitual work would not stand a varnish of high transparency—it would make their pictures far too hard; and there are others the habitual characteristics of whose plates a varnish of strong colour would render as flat as a sheet of printed matter. But within these broad divisions there are always cases occurring where a change of varnish will be found to work a great improvement; and all photographers would be wise to have more than one kind at hand, if they can only get them all equally trustworthy.

Some interesting observations have lately been made on this subject by Herr Joseph Ungar, in the *Photographische Correspondenz*, which are worthy of attention. This gentleman is known favourably as a shrewd photographer of taste and ability, whose thoughts and observations have always a strictly practical turn, and he has lately been exercised over the varnish difficulty. We do not propose to give his remarks *in extenso*, but only the gist of them. He remarks at the outset that his object was not to invent a new varnish, but to observe the conduct of those already in existence with whose ingredients he was acquainted. This he has for some time done, and he has found that those varnishes which contained Venetian turpentine show the highest stability. The fact may be tested by preparing a varnish composed of two parts of yellow shellac and one part of turpentine, without admixture of any other resinous substance, dissolved in weak alcohol. This is not set down as absolutely the best formula, but merely as a workable one which has stood the test of use thoroughly. Its brown colour is sometimes an objection to it, however, especially if it be laid on at all unevenly, when, of course, it produces streaks and uneven prints. It is not so fluid either as might be, and this, of course, helps to aggravate the danger from that source when retouching, for instance, has caused obstructions on the surface of the film.

Two other sorts of varnish, which differ from each other only in the proportions of turpentine which they contain, may be mentioned. In these sandarac plays the chief part in the one case, with one-third proportion of turpentine and a fourth of camphor; and in the other, with a sixth of camphor and a half of turpentine. Both of these are good, but especially the last. They may be worked upon with Faber's hard Siberian graphite pencil without injuring the film—a very severe test. Plates so varnished may lie for weeks in a weak solution of nitric acid without their surface seeming to be in the least penetrated. The cohesion of these varnishes, however, weakens with time, so that retouching them with the pencil a year after varnishing would be very apt to cause holes. Even then it was seldom that the film cracked, and only when carelessness in leaving the edges untrimmed, or storage in damp places, or where there were extreme variations of temperature, was the cause. By the addition of some turpentine a bad varnish may sometimes be converted into a good one. In this respect the addition of castor oil, recommended often, has not by any means the same value as turpentine. This tough substance, it is probable, acts as a corrector of the brittleness in ordinary varnish; and, whether or not, practical experience leads

Herr Ungar to say that it should never be wanting from a good negative varnish of any kind.

Yet, although so valuable, turpentine may be so employed in varnish as to bring absolute destruction to the plate. It is, fortunately, easy to prevent this; but it is necessary first to get rid of some false impressions. As we have already remarked, different varnishes affect the same kinds of plates differently, and it may also be said that the same varnish sometimes seems to act in a different fashion with plates of the same kind also. Many photographers have experienced the mishap of suddenly finding a negative thinned in a mysterious manner after varnishing, quite beyond any normal action of the varnish—in fact, till all printing from it was out of the question. But as to the cause of this many appear to be under some misapprehension. Some blame the pyroxyline, and others the alcohol, in the varnish. The first it can hardly be; for then all negatives made with a particular collodion would be likely to behave in varnishing after the same provoking fashion, which does not occur, for ordinarily all goes well enough until suddenly there comes a clean sweep that amazes and puzzles the unlucky photographer. Neither can the alcohol be well blamed for the same reason, and because also it is usually employed too weak in varnish to hurt the image. Even when the varnish may be made with the absolute spirit to begin with it is afterwards diluted, and could not produce the drastic effect in question on the image. Not only so, but the solvent action of alcohol is different; it carries away the film from below the image, as it were, so that the silver deposit comes off in greyish furrows.

Some other agency must, therefore, be at work, and a very little experiment suffices to show what that is. One has but to take a twenty-per-cent. solution of turpentine in alcohol at 40° B., and pour some of it over a well-heated plate, and anyone can then have the pleasure of seeing a picture disappear in the fashion described, no matter what collodion be used. The stronger the turpentine solution the more thorough the stripping. A high temperature and a strong alcohol are favourable to the process.

In order to determine how far a man might go with this gum in varnish, Herr Ungar prepared a varnish containing equal parts of shellac and turpentine, and it was found by him that cold or slightly-warmed films might be coated safely, and, after coating, dried by the fire (*i.e.*, by the heat of the German oven, of course); but if the plate were well warmed beforehand then the picture was attacked. Here we get at the cause why one plate of a batch should suddenly be taken in this manner and the rest spared. In the first place the doomed plate is probably overheated, and, in the sécond, the proportion of turpentine must be too high. It should not be higher than half the quantity of shellac, and will then give an admirable varnish. Of course, evaporation during varnishing tends to concentrate the solution, and should be guarded against; but otherwise the varnish may be used with perfect safety.

In confining his observations to turpentine in combination with these two other gums Herr Ungar merely limits himself to his own experience. He has not tried other combinations, but he does not therefore presume to say that others may not give excellent results. If photographers will try the plan of using turpentine, and on their own line of operation, and give their experience freely, there is every probability that many other modifications may be found.

HIGH TEMPERATURES AND PHOTOGRAPHY.

With the thermometer at 94° in the sun and 86° in the laboratory I have little inclination or ability for experiment, and find it difficult to write on anything but heat, and some of the consequences which it brings in its train. I have had some experience in photographing when the temperature was fifteen degrees below freezing point, and water to wash the plates could only be kept liquid by constant application of artificial heat, and when the bath and other solutions required to be kept immersed in warm water; and I have also enjoyed weeks of landscape work under an almost vertical sun, whose tropical heat made the tent like a baker's oven, in which the thinnest of clothing was a burden hardly to be borne, and have done pretty good work under each set of circumstances. In either part of the world such conditions were the rule and not the exception, and, in consequence, the whole arrangements were made as an outcome of general experience, and not devised to meet an accidental or unusual emergency. In this country these exceptional circumstances occur so seldom that they take us unawares, and find us unprepared to grapple with them, the result being a general disorder in the photographic laboratory.

I believe there is no necessity for this state of affairs. The effect of high temperatures on chemical action is well known, and so also are the various methods by which they can be lowered and their action restrained; and I feel certain that a little forethought and consideration would go far to deprive the hottest day of all its baneful influences in the tent, the dark room, and the studio.

It is in the tent, probably, the operator suffers most inconvenience, and it is here the remedy is most easily applied. I well remember an occasion on which I desired to take a negative of a cane field with a gang of Coolies at work, and as there were no trees within an easy distance—one did not care to walk far under a temperature of 125°—the tent was pitched under the blazing sun. The tent was of English manufacture, and, of course, black; but why it should be so I am unaware, unless it were that the makers had never had an opportunity of trying them out of England. By the time I was ready to coat a plate the black surface had absorbed such an amount of heat that the collodion, although a tolerably alcoholic sample, seemed to boil as it was poured on the glass, and anything like a satisfactory film seemed impossible. The remedy, however, was not difficult to find. A few yards of white calico were soon converted into a tent cover, which an assistant kept moist with a few calabashfuls of water from the nearest trench. The water, of course, under the sun's heat, was rapidly converted into vapour, and the reduction of temperature in the tent was practically represented by the difference between the quantity of heat in the water in its respective states of liquid and gas, the result being an interior as comfortable for photographic work as that of the ordinary temperature on an English May day.

The practical application of this principle is capable of very general adoption, and I am sure my readers will not regret the trifling outlay required if they will only give it a fair trial. Who, for example, has not experienced something of the annoyance of an over-heated glass house, where, in spite of some attempts at ventilation, the temperature, during the best working hours of the day, ranges occasionally from 75° to 85°, enervating the operator, and ornamenting the sitter's face with streams of dusty perspiration, his neck with a limp and shapeless collar, and altogether so trying to the temper of both that anything like a successful portrait was out of the question?

Now, although a studio is not so easily cooled as a tent, it is to a large extent amenable to the influence of water; and probably one of the best methods of applying it is one that is now being generally adopted. It consists of an inch lead pipe laid along the ridge of the roof and connected with the main or with a cistern at a higher level. The pipe is pierced along its whole length with fine holes, about an inch apart, which delivers the water in thin streams running down the glass roof and evaporating as it runs, cooling the glass, which, in its turn, cools the adjacent air, causing it to descend in a most refreshing way. I may add that the working cost is very little, the quantity of water required being only sufficient to keep the roof moist.

The dark-room difficulties arising from high temperatures are more complicated, but are to a large extent also amenable to the vaporisation-of-water remedy. In tropical climates wine and water are cooled by the bottles being enveloped in cloth jackets which are kept moist and placed in the sun. The solutions of the laboratory may, in the same way, be readily reduced from, say, 75° to 60°, and the unequal toning of paper, and many other evils entirely got rid of by a liberal sprinkling of the floor with water, or, better still, by hanging up wet towels.

It is, of course, always desirable to slightly modify the chemical arrangements during the prevalence of unusually high temperatures, although, so far as my experience goes, this is not generally sufficiently attended to. Everybody is aware that the conditions necessary for the production of high-class work is the even balancing of the whole *matériel* which go to form an image, and that when such conditions are in the highest degree attained only some very trifling disturbing influence is necessary to upset the whole arrangement. I was present a few days since with a friend who had been commissioned to take some half-dozen negatives of a new lecture-hall, and, as he was specially anxious to do full justice to its very beautiful interior, he had made his preparations with more than usual care. The first three negatives were all that good negatives should be—without speck or flaw; the fourth was slightly marked at the sides; and the fifth and subsequent negatives were simply failures—not from the superficial fog apparently laid on with a brush so frequently seen, but from a somewhat similar appearance in the body of the film. The silver bath was contained in an ebonite vessel, which had done its duty well and for a long period; therefore, no suspicion was attached to it. The operation was suspended for the day, the thermometer indicating 82°—a rise of 25°, as it stood at 57° in the morning. The work was resumed next day, with a similar result; all went well till the temperature rose to 76°, when the streaks again appeared. Acetic acid was added to both developer and bath, but with no apparent benefit; and the work was only satisfactorily accomplished by the addition to the bath of a pretty large quantity of nitric acid.

On another occasion I saw the same friend sadly tried when printing an enlargement on canvas for the painter. His usual method is to sponge the prepared canvas with a weak solution of ammonia, and then with a rag to apply a solution of chloride of sodium and a small quantity of gelatine. This is dried by heat, and a solution of silver applied—also with a rag—dried artificially, and printed under an enlarged negative. As a rule, his results are both certain and satisfactory; but on the occasion referred to, which was about the most broiling day we have had, he encountered nothing but failure. All went well till he came to dry the canvas after the silver had been applied, and then it blackened, or rather darkened, all over. After various other experiments nitric acid added to the silver was here also found to be the remedy; but, although it kept the picture clean, it rendered the film so fragile that it was liable to be removed in patches during washing after fixing.

An Old Photographer.

Contemporary Press.

PHOTOGRAPHIC IRRADIATION.

[Nature.]

For the purpose of determining whether any sensible amount of the photographic irradiation surrounding the image of a bright object could be traced to an action taking place within the thickness of the collodion film, I some time ago tried an experiment in many respects similar to that detailed by Mr. Aitkin in your last number (vol. x. p. 185).

A piece of cardboard with four parallel narrow openings, each some twelve inches long, was hung against the glass roof of a photographic studio so as to be projected against the background of a bright sky. One of the slits or openings was covered with a piece of red-glass, another was glazed with blue glass, the third was left entirely uncovered. and the fourth was covered by a piece of thin tracing paper. The slits in the cardboard screen were carefully focussed, and over-exposed photographs were taken with a camera in which no stops were used. Upon the collodion film and immediately in contact with it was laid a piece of platinum foil quite thick enough to be perfectly opaque. The camera was so placed that the images of the slits fell partly upon the platinum foil and partly upon the collodion film.

I have now before me two of the plates, each taken with an exposure of five minutes. The first was coated in the ordinary manner with a single collodion film, but the other was coated three times successively with collodion, so that the film was rendered very thick; but the eating in or encroachment of the photographic images of the slits under the platinum foil is hardly perceptible in either plate—indeed, I feel that I cannot say with certainty whether there is any encroachment of the image proper, though there are very marked brush-like extensions from the ends of the images, as well as a cloudy semicircular field symmetrical with the end of each image, evidently arising from reflections from the back of the plate. At first sight the brush-like semi-opaque extensions might be taken for the ordinary photographic irradiation eating under the platinum foil; but on more closely examining the ends of the images the hazy opacity is seen to extend farther in some directions than in others, and to be broken up in come cases into five or six little streams or brushes. The decrease in the opacity of the brushes is also less uniform than the decrease in the opacity of the ordinary irradiation border. The brushes extend to a distance of about ·02 inches under the edge of the platinum foil.

I do not at present see my way to devise an experiment which would determine what is the cause of these little brushes, nor have I at present had an opportunity of repeating a similar experiment with the dry-plate process; but the brushes have the appearance to me of having been produced by streams in the delicate film of liquid which must extend under the platinum—streams which probably carry with them little masses of light-altered silver that are soon deposited or strained out in the spongy tissue of the collodion.

If the spreading action under the platinum foil were caused by light dispersed within the thickness of the collodion, one would expect such action to take place symmetrically around the place where the bright image is cut off, instead of being broken up, as I have described, into bundles or brushes. On the other hand, slight differences in the texture of the collodion, or minute inequalities on the edge of the platinum foil, might cause the streams in the liquid film to move more easily at one point than at another.

I should be glad to be informed what was the distance of the opaque bar from the collodion plate in Mr. Aitken's experiments, and whether there is not any photographic trace of defraction bands, owing to the bar not having been in focus; possibly the presence of these may account for the apparent difference in our results. It will be seen that the experiment which I have described points to the same conclusion as that formerly announced by Lord Lindsay and myself, viz., that the inner photographic diffraction edge is chiefly due to the imperfection of the instrument producing the image, chief among which is to be counted the aberration of oblique pencils.

A. Cowper Ranyard.

Mr. Aitken's observations on photographic irradiation in *Nature*, vol. x. p. 185, are confirmed by many experiments I have made. I spent a long time in efforts to get rid of irradiation in bromide of silver films, one of the results of which I stated in a former note to *Nature* (vol. x. p. 63). There is the most striking difference in the behaviour of films containing iodide of silver only to those containing the bromide alone, the latter, especially when dry, giving much greater irradiation; and the difference is again complicated by the addition of certain substances (notably albumen) to the film in the course of preparation. As my experiments were mainly with dry plates I will leave out of question the forms which the phenomenon may assume in wet-plate photography, and summarise the results of hundreds of experiments with dry plates iodised, bromo-iodised, and bromised.

With a simply bromised film the amount of irradiation is extreme. The film is very translucent, and the irradiation is of two kinds—that caused by reflection from the back of the plate being by far the most extensive, but remediable by the usual expedient of coating the back of the plate with red or black colour, while the form noticed by Mr. Aitken is perhaps partially inherent in bromised films, but to a much greater degree dependent on the nature of the pyroxyline. Two samples of pyroxyline made at different temperatures, and treated in precisely the same manner, differ so much that while one will, with the coloured backing, give scarcely a perceptible degree of irradiation, the other will develope it to an extent which no backing, nor even tinting the film with the aniline reds, will obviate. The former is generally a compact, lustrous film, scarcely to be distinguished from the glass itself, while the other (both being used without preservative solution) will give a dull and dusty-looking surface, only capable of reflecting at very small angles. If with the latter a strip of blackened wood be laid on the film, so as to cut across the lightest portions of the image thrown on it by the lens, the effect of the light will be found to spread behind the strip of wood, sometimes to the extent of a centimetre; but I have never noticed the sharp limitation of this form of irradiation which Mr. Aitken observes, and which probably depends on the wet state of the film. It is clearly, as he supposes, an agitation which is set up in the film, and which depends for its propagation amongst the surrounding molecules upon a kind of chemical transparency in the film holding the bromide of silver. That this is to a great extent true is shown by two experiments:—1. A film which, in its simple state, gives considerable halation will, when coated with albumen—especially if coagulated with nitrate of silver—give none at all or very little, though the ocular transparency is rather increased than diminished by the albumen. 2. An emulsion prepared by exposing it to the action of nitrate of silver until it becomes structurally decomposed, and highly charged with bromide of silver, shows absolutely no irradiation under any circumstances, even if the glass be not backed, and no kind of preservative used. The film in this case resembles unbaked porcelain in its whiteness, entire want of lustre, and in opacity, and the molecules of bromide of silver are more than usually free from any restraining influence which a preservative might be expected, reasoning from the usual action of the albumen, to exert. In these two cases of extreme translucency and opacity of the film there is almost an equal freedom from the phenomenon in question.

In the old albumen process with translucent films the irradiation is imperceptible, and in the collodio-albumen, where the film of albumen is allowed to remain on the collodion, it is almost so; but in this case, as in all cases where the film is charged only with iodide of silver, there is another element which complicates the action. The bromide of silver is reduced *in situ*, while the iodide requires a supply of silver from the developer from which to build up the image—in the one case the deposition being by reduction, in the other by accumulation. This alone would account for a wide difference in respect to irradiation, but will not account for all, as is proved by the reverse results obtained from different bromide films, due to the varying structure of the material which holds the bromide in place.

What Mr. Aitken calls "molecular irradiation" (and which is not by any means the harmless thing he considers it in regard to artistic photography any more than to scientific) is unquestionably the great enemy of all photographic precision. It seems, however, to be complicated with what I have been obliged to call structural irradiation, alluded to above, and depending, as I have said, on the mechanical rather than the chemical condition of the pyroxyline of which the bulk of the film consists. The subject yet demands much investigation of a purely empirical character, in order to determine the quality of a vehicle for carrying the sensitive salts, neither chemical analysis nor chemical analogy affording any indication of the true cause of the difference between the two qualities of the pyroxyline I have noted, nor do they, so far as I am aware, account for the difference between the action of collodion and albumen.

W. J. Stillman.

Our Editorial Table.

PRINTING AT HOME. By JABEZ FRANCIS, Rochford, Essex.

THIS *brochure* is the second edition of a series of very plain and simple directions by the study of which those ignorant of printing (*typographic*, not *photographic* printing) may acquire a great amount of information of a very useful and practical character. Mr. Francis's little book is not intended for the professional printer, but for the amateur; and we are convinced that what he says in the opening chapter is quite true, viz., that "there is probably no art or science calculated to afford so much gratification to amateurs as printing, inasmuch as it is a valuable handmaid or assistant to all other arts. It can be pursued without being a source of annoyance to any-one; makes no mess or litter if care is taken; its operations are silent, and can thus be carried on in the parlour or drawing-room; while the act of multiplying copies of any kind of work by the aid of a printing-press is generally viewed with delight by every member of a family. Printing may be made to afford a profitable amusement for many. Either parent may write an essay, poem, or a note to friends at a distance, a young lady daughter may 'compose' it, *i.e.*, put it in type, and and 'proof' it; the proof may be read by all and corrected. It is then 'made ready,' and one rolls the 'forme' or type, while another prints at the press. These operations, so divided, will form an endless source of gratification."

Mr. Francis, as will be ascertained from his advertisement, aims, by supplying small printing-presses at a very cheap rate, to bring this source of gratification and amusement within the reach of every person; and by means of this manual, which is sold at the exceedingly reasonable rate of one shilling, an immense fund of information is imparted, including all about the "setting" and "distributing" of the type, printing in two or more colours, printing in gold or silver, and even the making of rollers. A valuable item in the work is a few pages devoted to specimens of types, all of which are named. Thus the technical mysteries of "long primer," "brevier," "pica," "nonpareil," and all their numerous ramifications are laid bare, and the reader is initiated not only into what they are, but what is their price per pound weight.

Passing from the book and the type to the press itself we conclude, from an examination of some drawings of these appliances we have received, that they will prove useful to the photographer, not merely as a means of printing any small notices, descriptions of pictures, circulars, and soforth, but, what is of far more importance to the photographer, as a means of printing photographs in permanent printers' ink by the "mechanical," "lichtdruck," or "collotypic" process. As we succeeded in producing really excellent prints of this kind by the aid of the crude wooden press we described some time ago, we do not see why, aided by a more perfect appliance of the kind manufactured by Mr. Francis, even better results should not be obtained. We may shortly have more to say on this subject.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE first outdoor meeting of the season was held at Rabelston, on Saturday, the 11th inst., the liberal proprietor, Mr. Murray Gartshore, kindly conveying the party from Edinburgh to his residence, where they arrived about eleven o'clock.

The day unfortunately was, in consequence of very high wind, unfavourable to photographic work, and several of the cameras remained unpacked; but a few of the more enthusiastic members went at once to work and secured some good negatives of the fountain and the statuary, bearing date 1628. The others, accompanied by the host, started on a tour of inspection through the beautiful grounds, with a view to a subsequent visit on a more favourable day. They were then shown through the house, which everywhere engages the attention of those interested in literature and art. The library is rich in valuable books, and the collection of pictures very excellent. The workshop, with its large collection of fine tools, and the photographic laboratory occupied the rest of the afternoon, after which the party were entertained at dinner in right royal style.

After dinner the members constituted themselves into an ordinary meeting, Dr. John Nicol occupying the chair.

Mr. Barclay was admitted an ordinary member of the Society.

Mr. PRINGLE said he wished to make some remarks in connection with his observations at a previous meeting about Weston's rotary burnisher. When he made those assertions his firm had only had the burnisher in use for a few days, and their first experience was not at all favourable to it. Since then, however, more extended practice had induced them to change their opinion, and he had now much pleasure in saying that the burnisher did its work so admirably that he did not think they could get on without it. The scratch in the burnisher which marked the cards was easily polished out with a hone, and the surface which it produced gave such transparency and beauty that a number of *cartes* which had been condemned as not up to the usual standard had, after burnishing, been found quite up to the mark.

Mr. TURNBULL admitted that the burnisher produced a fine surface, but not better than could be produced by an ordinary rolling-press with a hot plate. He showed specimens of the work of both, in which it was impossible to tell which had been through the burnisher and which through the press.

A hearty vote of thanks was then tendered to Mr. Murray Gartshore for his excellent entertainment, and the meeting was adjourned, the members reaching Edinburgh about eight o'clock, much pleased with the excursion, notwithstanding the unphotographic character of the weather.

Correspondence.

MONSIEUR DAVANNE'S PAPER ON DOUBLET VIEW LENSES.—SUBSTITUTES FOR INDIA-RUBBER.—PHOTOGRAPHS ON TOMBSTONES.—THE COMET.

AT the last meeting of the Photographic Society of France M. Davanne, as described in the last number of this Journal, exhibited some prints from negatives which he had taken during the past winter, in the south of France and on the shores of the Mediterranean, with Mr. Dallmeyer's "wide-angle rectilinear."

Judging from his remarks one is led to conclude that the lens possessed too much roundness of field, owing, perhaps, to the component lenses being placed too close together. [See my remarks on doublets in a recent article.] In order to get a flat field with good marginal definition, the most oblique pencil must be incident perpendicular to the front surface of the front lens, and must emerge perpendicular to the back surface of the back lens; and for this purpose the lenses must not be too small nor be placed too close together. To sacrifice good marginal definition to mere portability and convenience is, in my humble opinion, a mistake.

Next we come to the performance of each lens of the combination singly. The front lens, of sixteen inches focus, works well with the largest diaphragm, but shows the distortion which is common to a single view lens.

But M. Davanne regrets that he cannot say as much for the posterior lens used singly with the stop in front. This has twelve inches focus, and he thinks that it ought to cover a plate ten inches wide; but it will not do this even with a small diaphragm. He thinks it would be very desirable to have a single lens of the doublet of a focus intermediate between sixteen inches that of the front lens and seven inches that of the entire combination. Of course it would; and I am at a loss to understand why the twelve-inch focus back lens did not answer the purpose of a single lens. The stop may, perhaps, have been too close to it. M. Davanne concludes by submitting to opticians the problem of an unsymmetrical doublet, which shall answer equally well three purposes, as above suggested, viz.:—

1. To cover a square, the sides of which shall be double the focal length of the combination, with sharp definition up to the edges, equality of illumination, and freedom from distortion.

2. To compose this doublet of lenses, whose focal lengths are as 5 to 3, so that the longest focus shall be equal to five-fourths of the side of the square, and the shorter focus equal to three-fourths of it.

3. To suppress all unnecessary weight of brasswork in the mounting.

What I would myself venture to suggest as a very simple and perfect system of view lenses for a plate seven inches square would be to have three deep meniscus lenses, of focal lengths respectively ten, fifteen, and twenty inches, and to use any two of them together as a doublet, in a suitable mounting, with a revolving diaphragm having apertures of four-tenths, three-tenths, and two-tenths. In screwing any particular lens into the tube the means would, of course, be devised for adjusting it to a suitable distance from the diaphragm—that is to say, a distance proportional to its focal length. The diameters of the lenses would also be such as to admit of a large circle of light.

Now let us see what these three lenses would give us:—

The ten-inch and fifteen-inch together would give a doublet having about six inches equivalent focal length.

The ten-inch and twenty-inch together would give a doublet having about seven inches focal length.

The fifteen-inch and twenty-inch together would give a doublet having about eight and a-half inches focal length.

In addition to these we should have the three single lenses of ten, fifteen, and twenty inches focus respectively.

The series of focal lengths would, therefore, be as follow:—6, 7, 8½, 10, 15, 20, for a seven-inch plate.

This would meet every reasonable want of a landscape photographer.

The lenses not in use might be kept in a suitable case. And here I would suggest that a fourth lens of the same focal length as one of the other three might be added in order to make one symmetrical pair. If this fourth lens were one of ten-inch focus it would give with the other ten-inch focus lens a symmetrical doublet for a very wide angle of view, the combined focus being about five inches for a seven-inch plate.

M. Davanne, I think, rather goes to an extreme in demanding a lens of a combined focus of only half the width of the plate. Pictures upon flat plates which include such an enormous angle as this would be inartistic and objectionable.

With respect to the curves of the three lenses, they should be very deep, and in all cases strictly proportional to the focal length.

The single lenses might be used with the stop either in front or behind. In the latter case the field would be rounder, which would suit some subjects better, as one of our Editors has lately shown in a leading article.

The little case containing the glasses not actually in use would be so small and portable as not to amount to a serious practical objection.

Many good substitutes for india-rubber are now being employed in the arts. Amongst them is the common milk-weed (asclepias), fermented, pressed, and evaporated; a gummy liquid then separates, which can be easily vulcanised, and forms a tolerable substitute for india-rubber. The seeds of common flax can also be treated in the same sort of way. No doubt these novelties will in time find their use in connection with photography.

It is now becoming quite a common practice in Shrewsbury to put a *carte de visite* of a deceased person upon the tombstone. This is, of course, protected by a glass, but it no doubt fades quickly. Why not, then, print in carbon upon the inner side of the glass itself, and back the print by a white pigment, and then by a thick slab of glass or slate? A print of this kind would only cost three or four shillings, and would be much more durable and satisfactory than a paper print. Or, instead of the white pigment, why not paint the carbon print upon the back, after the fashion of *neōleo-peinture?*

A provincial photographer of some eminence wrote to me the other day saying that trade was flat, that he wanted to introduce some novelty, and that this new style of portrait, as described by me, had quite struck his fancy, and that he meant to take it up. I hope the Autotype Company will lend all the aid in their power to sensible professional photographers like this gentleman, and not let them send to France for information and materials.

Mr. Norman Lockyer has been trying, but without success, to photograph the comet in Mr. Newall's monster refracting telescope at Gateshead (object-glass twenty-five inches diameter). He gave ten minutes' exposure, but got no result; whilst a small star in the "Great Bear" gave an image with two minutes' exposure. THOMAS SUTTON, B.A.

July 20, 1874.

"HARDNESS IN NEGATIVES."

To the EDITORS.

GENTLEMEN,—At Mr. Batho's request I have referred to his article on the above subject, and I see no reason to change my opinion that he considers *the* cause of hardness in negatives was the gradual deterioration of the bath. In his last letter he particularly emphasises that he said "*some* of the causes." The other causes he assigns for this hardness exist possibly in his imagination—not in his article; at any rate, I would have passed his letter for what it was worth had he not so delicately alluded to a small clerical error in substituting the word "bath" for "developer," the context sufficiently explaining the lapsus—to *others*, at any rate. I presume, as he hangs such stress on this unfortunate peg, that he has never heard of an "iron bath," although it has been a method of developing that has at various times found favour with many in preference to the usual pouring on.

As to the extraordinary idea that a nitrate bath is not a nitrate bath till it is in good order, I suppose I may continue this line of argument and say a nitrate bath is not a nitrate bath when it gets out of order. One would suppose, from Mr. Batho's remarks, that an "aqueous solution of nitrate of silver pretty nearly saturated with iodide of silver" was the acme of perfection in a negative bath. I think there are very few practical men who will endorse this idea as it stands. No matter how the bath is saturated with iodide it invariably works better after a little use; however, Mr. Batho seems to think the contrary, and that the bath gradually deteriorates from the *first*.

How about bromides, &c., introduced by the collodion? Mr. Batho seems to ignore everything but iodide of silver. But, perhaps, he may work with a home-made collodion which gives different results to that purchased ready made. As, however, the majority of photographers purchase the article ready made by preference, conclusions drawn from such experiments could scarcely apply to the causes of hardness alluded to in Mr. Batho's first article.—I am, yours, &c., E. DUNMORE.

Llandudno, July 20, 1874.

PHANTOM IMAGES.

To the EDITORS.

GENTLEMEN,—I observe an article by Mr. G. Watmough Webster in your pages on the above subject, and the inference to be drawn from it is that I did *not* use a sunshade in the case in question; hence the image. Now I have an universal shade adjustable to all my lenses, and never take a picture without it, and so that does not apply in this instance.

I do not think the appearance was caused altogether by reflection in the lenses themselves, for I have taken interiors with the same lens, under exactly similar circumstances, without the phantom. Anyhow, it is very annoying. The weather here is intensely hot.—I am, yours, &c., W. HARDING WARNER.

Denbigh, North Wales, July 18, 1874.

ALLEGED INFLUENCE OF THE CHEMICAL RAY.—In a note received from Mr. W. H. Warner, of Denbigh, that gentleman says it has occurred to him that the following information may prove useful and interesting to our readers during the present very hot season, especially to those whose vocation calls them to be out in the sun:—"About a year since I saw in a foreign newspaper an account of a case of sunstroke written by the sufferer himself. After enduring for a long period the effects of the attack, and having in a considerable degree recovered, he experienced considerable suffering even from the rays of the moon. This led him to reflect that it was not altogether the heat of the sun which produced prostration. After much research he discovered that the injury came from the chemical ray, and not from the heat ray. He was guided to this by observing the fact that a photograph could not be taken through a yellow glass. Accordingly, he lined his hat with two linings—one of orange-yellow to arrest the chemical ray, and one of green to arrest the heat ray. Thus prepared, he went where the rays of the sun were most intense with perfect impunity. It is well known that the negro seldom suffers from sunstroke. The colour of his skin over the skull being of the orange-yellow may, perhaps, account for the fact. I carried out this suggestion all last summer. I lined my hat with green and orange-yellow paper, and had sufficient confidence in the truth of the theory to neglect my umbrella, which I had never done before. I have mentioned it to many, who have also tried the plan, and in many cases coming under my own observation it has been uniformly asserted that the oppressive heat of the sun upon the head was much relieved."

SENSITISED PAPER.—At a recent meeting of the Photographic Section of the American Institute, Mr. H. J. Newton, President, made some observations on this subject. He said:—The preparation of a sensitised albumen paper as a commercial article has not been successful. It has been either too expensive to meet the popular demand, or deficient in keeping quality. There are several ways by which paper can be prepared so that it will keep indefinitely; but, as a rule, it is exceedingly difficult, if not impossible, to make a print on such paper that would not ruin the reputation of any photographer, especially after it is a week old. Some time since, in experimenting in this direction, I found that by floating the albumen paper back down for one or two minutes on a solution of hydrochloric acid—one ounce of acid to forty ounces of water—and drying, it would render it capable of keeping perfectly for ten or twelve days after sensitising. Not only this, but the prints made on paper thus prepared were remarkably fine, and also those made after ten days' keeping were equal to those printed immediately after sensitising. Paper so prepared should not be fumed until required for use. After the paper has been removed from the acid solution and dried it would be well to pack it away under a light pressure, placing the albumen surfaces together, so that when required for use it will be in proper condition to put upon the sensitising bath. As it is a great convenience for photographers to be able to keep paper for several days after sensitising without its deteriorating, I would suggest that some of our many manufacturers of albumen paper prepare some of it in this way, as I am sure that photographers would willingly pay the extra expense. * * In the toning of these prints I used a little tartrate of antimony, and it worked very well. In the first place, the prints turned red—a very deep rich colour—and toned up from that. I have not experimented enough to give a reliable formula, but I would suggest half-an-ounce of tartrate of antimony, which is commercially known as tartar emetic, dissolved in sixteen ounces of water; for each grain of gold use half-a-dozen drops of that solution, and increase it until you get the desired effect.

EXCHANGE COLUMN.

A porcelain dish for whole-sized sheet will be exchanged for a Howard's tent; also a card rolling-press in exchange for Elbert Anderson's *Skylight and the Dark Room*.—Address, J. WILKINSON, 32, Albion-street, Burnley.

I will exchange a 5 × 4 mahogany camera and lens, portable dark tent, operating stand, dishes, printing-frames, baths, bottles of dry and moist colours, several gilt show-cases, and glass boxes, for a watch and albert, or jewellery.—Address, F. SWIGG, 15, Henry-street, Plymouth, Devon.

ANSWERS TO CORRESPONDENTS.

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

J. H. FITZGIBBON (St. Louis, Mo.)—Thanks. In our next.

AUSTRALIAN.—Mr. Mayall is a photographer, not a painter.

GLORIOSUS.—We have a rule, to which we adhere most rigorously, of never recommending the portrait lenses of any special manufacturer.

S. M'B.—We do not altogether approve of the plans of your proposed studio. The sides are too high by at least twenty-four inches, and the roof is rather too flat.

ERRATUM.—The maker of the surveying barometer reviewed in our last number is Mr. *J.* H. Steward, 406, Strand; and *not* W. H. Steward, as inadvertently printed.

R. A. D.—The process and formulæ employed by Colonel Stuart Wortley must be deduced from the various papers on the subject he has contributed to this Journal.

BICHROMATE.—You are succeeding very well. The copies are *nearly* as good as the originals. By trying another sample of graphite you may succeed still better.

A PROFESSIONAL.—The readiest remedy for the prevalent evil of strongly-marked freckles is to be found in the puff-box. Mix a little yellow with the white colour.

BOETIS.—To register a design made of metal or wood will cost a guinea. We imagine that your invention would, however, be a fit subject for a patent. Please supply particulars.

S. F. R.—The once-famous portraits of M. Adam-Salomon were doubtless greatly indebted to the art of the retoucher, but especially to the work bestowed upon the print itself.

RUSTIC.—The collodion emulsion referred to is slower than wet collodion, but it is very sensitive for all that. We are unable to give a clue to your failure with the gelatine. Probably the great heat has something to do with it.

AN OLD READER.—The idea of the lens having undergone a change is so improbable that we advise you to look for the cause of the decreased sharpness in the shrinking (or swelling) of the dark slides, or of some other portion of the camera.

P. C. REMONDINI (Genoa).—A copy of Stillman's *Amateur's Photographic Guide Book* was forwarded by post on the 21st inst. In order to permit its passing through the Post-office the back had to be denuded of the usual cloth covers.

OPTICUS.—Larger discs than those you mention have been obtained. For example: M. Feil, of Paris, successor to Guinand, has produced perfect discs of optical glass twenty-eight inches in diameter. One of this size was exhibited in 1867.

FITZ JAMES.—The whole secret lies in using a double combination lens of short focus. A combination having a back focus of five inches and a front lens of three and a-quarter inches diameter would be very quick-acting, if it were at all well made.

W. H.—The piece of paper has reached us in a very discoloured state. That *something* is radically wrong we entertain no doubt; but we shall not make any attempt to suggest a solution of the difficulty until we have received from you further particulars.

JACOBUS.—To make a cement that will be very tenacious and quite fitted for all the purposes named, mix gelatine with a fourth part of its weight of glycerine. The real value of this cement will only be discovered after you have used it very extensively. Try it.

M. S.—We give the following as it was given to us, namely, as a "reliable" varnish for negatives:—

Sandarac	4	ounces.
Venice turpentine	2	„
Alcohol	16	„

After the sandarac has been dissolved in the alcohol add the Venice turpentine.

BOZ.—1. Although we shall be glad to receive such specimens of your work as those to which you allude, we shall be specially delighted with your own portrait for our album, in which we like to have every man of mark.—2. Mr. Hardwich is now, and has for several years been, a clergyman of the established church in the north of England. Mr. Dawson carries on the photographic classes at King's College, and when we saw him two days ago was tolerably well, and rejoicing in the prospect of a trip to Scotland for two or three months.

GEO. BURTON.—The principal focus of a lens is that at which rays from distant objects are converged to a point. The "conjugate" focus is an uncertain and movable point depending upon the distance of the object focussed. The nearer the object is brought towards the lens, within certain limits, the more is the back conjugate focus increased. For instance: suppose your lens gives an image of a distant lamp at the distance of four inches from its centre, by moving the lamp to a distance of eight inches from the lens the back focus will be increased to eight inches also.

A COUNTRY PHOTOGRAPHER.—This correspondent has been spending a fortnight in London and he writes to say that, after spending several days in examining the specimens in the show-cases of the metropolitan artists, he is bound to conclude that first-rate provincial photographers have nothing to learn from them. He is wrong: they may learn, in many instances, what to avoid.

SPIRIT PHOTOGRAPHY.—Mr. Beattie has favoured us with a communication on the subject of our recent article on M. Buguet's operations. He has also enclosed a letter he has received from Mr. Burns relative to the arrangement with Mr. Henderson, against whom M. Buguet was led to conceive a prejudice on account, we imagine, of something of a defiant air apparent in his proposals to investigate the matter. M. Buguet, says Mr. Burns, is an easy man to deal with if approached in a simple and confiding manner. Mr. Burns adds:—"I had several opportunities of examining thoroughly Buguet's processes, and I could see nothing unusual. Those well skilled in photography have done the same, with the same result. I have seen a number of photographs bearing images which have been recognised as the likenesses of deceased persons." And in connection with the recognition Mr. Beattie also says:—"I sent a clever artist to his (Buguet's) studio, and on a plate he got a likeness of his mother, who had been dead for fourteen years. I say nothing of the production; there was and can be no doubt of the likeness, and no likeness of her exists except a poor daguerreotype taken of her body after death." With respect to the ability of persons who even possess some knowledge of photography being unable to discover the means by which ghost pictures *may* be produced even when the most minute and searching investigation is permitted, we have before us a copy of the *Medium*, No. 114, in which nearly a page is occupied by Mr. Ripon, of Cambridge—whose acuteness no one who knows him will doubt—in which he describes with much detail the various steps taken by him in trying to discover how it was done, even to the taking of "the camera to pieces," unscrewing the lenses, &c., and although he selected a plate from an unbroken and sealed package of glass, and watched and assisted in every operation himself, beautiful well-developed spirit images appeared on the negative in addition to that of the sitter. This was done in Mr. Henderson's studio. The editor of the *Medium* says that Mr. Ripon's narrative is almost as alarming as the most genuine ghost story. So much for the difficulty of detecting a trick, even by one who is conversant with photographic operations. Respecting the identification of spirits, without in the least doubting the truth of what Mr. Beattie and Mr. Burns allege, we do know that a "spirit," of which a lay figure was the original, was recognised by a gentleman as a true likeness of a dear, departed friend; and we have been present when a cunning medium with a muslin mask over her face was "recognised" as the deceased mother of a lady present. One thing more. We have read, in a recent number of one of the organs of the spiritualistic movement, that one of the "spirits" in M. Buguet's pictures was "recognised" as being a copy of a portrait which was *engraved and published* long before the photograph in question was produced. We have seen much to cause us to distrust the powers of recognition of many spiritualists. We willingly, however, place on record Mr. Beattie's statement that, notwithstanding the fact that much deception exists in connection with the question of spirit photography, "*all* has not been deception."

A RUSSIAN INVASION.—We understand that the eminent Russian artist, M. Bergamasco, of St. Petersburgh, is at present in this country, having received a commission to photograph certain members of the royal family. In due time we shall expect to see the pictorial results of M. Bergamasco's visit. It is rumoured that in consequence of the high appreciation in this country of this gentleman's works, it is his intention to take up his residence permanently in London. We wish him every success.

METEOROLOGICAL REPORT,

For two Weeks ending July 22, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
9	30·20	W	63	71	93	58	Fine
10	30·19	W	67	72	91	64	Cloudy
11	30·05	E	65	70	80	65	Cloudy
13	30·17	SW	62	65	81	57	Dull
14	30·09	W	62	66	86	57	Fine
15	30·15	NE	61	67	—	59	Fine
16	30·25	E	61	66	77	55	Fine
17	30·30	SE	57	62	79	52	Fine
18	80·30	E	58	62	79	50	Fine
20	29·97	E	66	71	92	57	Fine
21	29·87	W	61	65	77	57	Fine
22	30·00	W	59	64	—	51	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 743. Vol. XXI.—JULY 31, 1874.

:HE FILTRATION OF SILVER AND OTHER SOLUTIONS.

ɴ a letter received from a friend residing temporarily in Venice ecurs this sentence—"I cannot tell you how much indebted I am for he filter you gave me when I was last at your office. I have shown ; to the celebrated ———, of this place, and he is also delighted rith it." In resolving to adopt this as the text for a few remarks rith regard to filtration, we may premise that the subject itself is ne so well understood as not to be susceptible of having much, if aything, which is really new said about it. Still, we doubt not that any of our younger and less experienced readers will be in the ame position as the two gentlemen alluded to in the opening sentence f this article, and hence we bespeak on their behalf the indulgence f those who have nothing to learn in this direction.

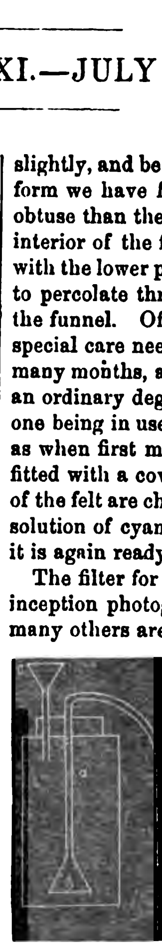
Why paper is still used by photographers for filtering their solutions re cannot quite comprehend. For filtering a nitrate of silver bath aper is open to two objections—one of them, however, being a rectifible objection. Even with the greatest care paper will frequently give ray in consequence of the softening action and weight of the liquid, nd the "inundation" which instantly follows is the knell of *that* ffort at purification. This objection admits of no rectification; for he weakness of any particular sheet is only ascertained by trial, and rhen once ascertained in that way it is left in a conditior in which ehabilitation is impossible—at least on this side of the paper mill. ut serious injuries to silver solutions have frequently been directly raceable to impurities—such as "anti-chlor"—left in the paper; nd not very long since we had a packet of filter papers so destructive, rom this cause, as to seriously damage all the silver solution which assed through them. But by means of soaking these papers in istilled water the obnoxious salt was dissolved out, and the papers rere afterwards found to be good.

A long period has elapsed since felt was first suggested as a subtitute for filtering-paper; and from having had that material in use or this purpose for a number of years we can recommend it as being n many respects preferable to paper.

The Wandle Felt Company manufacture a thin, close-grained felt, hrough which a silver bath may be filtered with rather more rapidity han it percolates through bibulous paper, while the liquid transmitted s absolutely pure as respects freedom from the mechanical particles in uspension, and the removal of which is the sole object of filtration. ut felt possesses two most important advantages:—First, a wellelected piece will last for many months, even if in daily use; and, econdly, no fear at all need be entertained of a rupture thus uddenly causing the filtered and still unfiltered liquid to be mixed ogether. This is both a comfort and a positive source of gain to the perator.

Felt filters may be divided into two kinds—those which may be sed by the tourist photographer, and those adapted more especially or permanent studio or laboratory use. It is to one of the former eference was made by the gentleman in Venice, and we shall describe t for the benefit of the reader. Let a piece of grey or white felt be ut to the shape of the inside of the funnel, or so as to nearly fit to t—a semicircular shape, when the edges are made to meet, being early the form required. The edges must be made to overlap slightly, and be sewed tightly together with strong thread. The exact form we have found best is that in which the cone is slightly more obtuse than the form of the funnel, so that while it fits tightly to the interior of the funnel all round the top it will not be in close contact with the lower portion. This is for the purpose of allowing the liquid to percolate through the felt, and pass freely down between it and the funnel. Of course, if the funnel have its interior well fluted no special care need be taken to ensure a fit. Such a filter will last for many months, and always be in a proper condition for work, provided an ordinary degree of care be bestowed upon it. We have known of one being in use for more than twelve months, and being still as good as when first made. The funnel is constructed of ebonite, and it is fitted with a cover. When there is reason to believe that the pores of the felt are charged with iodide of silver it is to be rinsed in a weak solution of cyanide of potassium, and, after a final rinsing in water, it is again ready for a protracted series of filtrations.

The filter for the operating-room is somewhat different, and for its inception photographers are indebted to Mr. F. W. Hart. We and many others are in a position to speak of its great convenience and value. To make obvious at once its construction and action we subjoin a diagram, in which *a* represents a large glass jar or bottle with a wide neck, and of sufficient capacity to contain the whole of the negative bath solution. It must have a close-fitting cork, through which two holes are pierced. In one of these holes is inserted from below a small glass funnel, *b*, with a tube of such length as to permit the top to reach to within a short distance of the bottom of the jar. Over the mouth of the funnel *b* is stretched tightly a cap of felt. A piece of india-rubber tubing is attached to its smaller end outside the jar, and allowed to hang down *below* the level of the bottom, for which purpose the jar must be placed upon a shelf. The lower end of the india-rubber tube is closed with a spring clip, not indicated in the diagram. At *c* is shown an ordinary glass funnel, the sole object of which is to admit of liquid being poured into the bottle.



This jar, being placed upon any shelf on which it may be found convenient to retain it, is filled with the nitrate bath through the funnel *c;* and the action of the syphon is then started by releasing the spring clip at the lower end of the outlet pipe and blowing into the funnel, which is easily done by means of a small piece of glass tube the lower end of which is set in a cork fitting into the funnel; this causes the liquid to rise immediately through *b*, and escape through the tube attached to it. After the action is thus started it will continue so long as there is a drop of liquid in the jar above the level of the mouth of the inner or inverted funnel, which, as we have said, is covered over with felt, and therefore filters all the fluid which passes through it.

In everyday practice, at the termination of the day's work the whole of the silver solution may be poured from the vessel in which it was contained into the jar; and in the morning, the bath having been previously rinsed out if required, is placed below the outlet pipe, the spring clip is eased, and the liquid at once runs out, being brightly filtered as it percolates. When the bath is full the pressure on the clip is relaxed, when the outflow ceases immediately. Thus it is *impossible* to removè any liquid from the jar without its previously passing through the felt filter; hence when a bath gets dirty from flakes of collodion or other matter floating through it it is cleaned by the mere act of pouring it back into the jar and drawing it off again.

The small piece of tube used for starting the action of the syphon may be laid aside in any convenient drawer, for it will not again be required until the state of the jar itself and the deposits at the bottom warrant its being subjected to a thorough washing.

THE UNION OF THE ELECTROTYPE AND PHOTOGRAPHY.

As the connection between photography and the printing-press is daily becoming closer we think every scrap of information relating to either, and especially when it relates equally to both, must interest our readers. Although many experiments have been made, and some pretty good results have been obtained by the combination of photography with the electrotype, we may safely say that the field is yet unexplored, and that in the practical application of photo-electrotype to book illustration and other purposes a rich reward awaits those who will go in and work out the process successfully.

Being thus impressed, a few days since we gladly accepted an invitation from one of the largest publishing houses in the country to visit, and minutely inspect, their electrotyping department, in which is being constantly reproduced steel-faced copperplates of great value—always equal, and sometimes even superior, to the original steel plate from which the cast was taken. As every facility for examination was afforded, and the use of the varied appliances granted for photographic experiments, we propose in this article to describe the production of an electrotype copy of an engraved steel plate, and in the next the result of our experiments with a view to substitute the production of the camera for the more expensive and less truthful work of the engraver, in the hope that some of our experimental readers will take the matter up and help to perfect what we feel sure will, by and by, become an invaluable technical application of photography and electro-decomposition.

Under the care of the courteous manager we proceeded to a large room on the ground floor of the establishment, where we were introduced to the presiding genius of the electrotyping department surrounded by the appliances of his art on a scale which we little expected to find, and sensibly clad in a rough flannel blouse to protect his clothing as far as possible from the action of the various acids used in the process. We soon discovered that he was a well-educated, enthusiastic lover of his art, understanding its theory as well as its practice, and not only able to communicate his knowledge, but, what is more rarely found, quite as willing as he was able—a man, as we were afterwards informed, of such perseverance and industry as to have, almost unaided, worked out for himself a method by which, probably, better work is done than in any other establishment in the kingdom.

It is well known that the early copies from a steel plate are much finer than any that can be got after some thousands have been printed; that the deterioration increases as the printing proceeds; and that the object of electrotyping is to keep the original plate in its primal state by printing only from its counterpart in copper. The first step in the reproduction is to *thoroughly* clean the steel plate. This is usually done by a suitable brush, and a mixture of very fine carbonate of lime and water. It is then dried and polished with naphtha, and again thoroughly dried, in which state it is ready for the cast to be made. For this purpose it is laid, face upwards, on a perfectly level table, and formed into a shallow tray by strips of thick plate glass laid along its edges, the thickness of the mould or cast being dependent on the thickness of the glass strips, and varying from half-an-inch to an inch according to the size of the plate.

Our attention was next directed to the composition of which the mould is made, which consists of one part of lard to three parts of gutta-percha. This is placed in a tin pot and on a hot plate, and either by steam or Bunsen burners raised to a temperature just enough to melt it thoroughly. In the case of fresh composition temperature requires to be maintained for two days, and freq stirring is necessary to produce a perfect admixture. When composition is ready and quite free from air-bubbles, and the warmed to about its proper temperature, it is slowly but ste poured over the engraved surface till the tray formed by the strips is quite and evenly full, and the process of casting is compl After two or three hours the cast may be gently lifted from the pl or, if left for twenty-four hours, it will of its own accord, by a slig bending, separate itself.

The cast, if well made—and the whole operation is so simple th failure is almost impossible—is a faithful, faultless transcript of th engraved plate, with, when examined by reflected light, a surfa like polished glass, and requiring only that the surface should coated with some conductor of electricity to be ready for the depositi trough. For this purpose, in most cases, a fine variety of plu bago has been used; but, in the first place, this is somewhat diffi to get, and, secondly, even the finest samples are objectionable, they do not give such perfect results as are desirable, and theref in some establishments the property which phosphorus possesses precipitating silver and some other metals from their solutions taken advantage of. A solution of phosphorus is first poured o the surface of the cast, and allowed to flow backwards and forwa till it is uniformly moistened, and then poured back into the bot Then the same thing is done with a solution of nitrate of silver, exc that the surplus silver is not returned to the bottle, as, of cou reduction of the whole solution would take place. The cast is th washed with a stream of water, and is found to be coated with a t but perfectly continuous film of metallic silver which acts as excellent conductor between the gutta-percha and the copper.

Our attention was next directed to the depositing troughs, or, the photographer would call them, copper baths. One may taken as a type of all. It consists of a wooden box lined with gu percha, and measuring about $5 \times 2\frac{1}{2} \times 2\frac{1}{4}$ feet. It is filled within an inch or two of the top with about 184 gallons of a satura solution of sulphate of copper. On a shelf, and level with the to the trough, stood six one-gallon cells, of Smee's construction—wh after much experiment, was found to be most suitable—char with dilute sulphuric acid of the strength of one to eight or ten. cells require to be recharged every two days, and the zincs n frequent amalgamating; but otherwise they continue to work almost any length of time without attention. In a line with each there lie across the trough two copper tubes, connected respecti with the negative and positive poles of the cell, and on these tubes suspended the prepared cast and copper plate—the former on negative, or zinc, the latter on the positive, or silver plate, of cell. The cast is suspended by strips of sheet copper so inserted to be in metallic contact with the silvered surface. Deposition the copper goes on slowly, and of course the time required depe on the thickness desired, about three weeks being required for plates we saw in progress, which measured about twenty by fourte inches.

When the plate has acquired sufficient thickness it is remov from the trough, cleaned, and passed on to the trimmer's ben where the thickened or overlapping edges are sawn off, and the ba filed flat. It is then handed to a higher-skilled workman, who bu nishes the high lights and otherwise gives it a final finish. T plate is now ready to be printed from; but as copper is comparativ soft it would not yield the necessary number of fine impressions, s so an iron or, as it is technically called, steel face has to be given it. This is done in a few minutes in the most simple way. T plate is brushed clean with very fine emery and water, and suspend in a trough-and-cell arrangement similar to that already describ but containing a solution of ammonia hydrochlorate, and a pla iron instead of copper. A film of pure iron of great hard is produced in a few minutes, and, after washing and cleaning plate is ready for the press. It will generally give three thou good prints without sensible deterioration; and when the iron su begins to fail it may be instantly removed by a short immersi weak nitric acid, which leaves the plate just as it originally came from the copper solution, ready for a fresh face of iron, from which three thousand more copies may be got, and so on *ad lib.*

We have given the process, as we saw it, somewhat in detail, as we are anxious to impress our readers with an idea of its simplicity, in the hope that when we publish the results of our experiments in the direction of photo-electrotype they will, as we have already said, help to perfect what is likely to be a most useful adaptation of photography.

The more than ordinary success of the firm whose method we have described is mainly due to two very important modifications which their electrotyper has worked out—one being in connection with the silver deposit, the other in the iron bath. Those we do not feel at liberty to publish in this article, as, in the event of their not being applicable to photography, they would prefer to keep them as trade secrets; but if we succeed, as we have every reasonable prospect of doing, in bringing photography to bear on the production of plates, we shall then receive full permission to explain both methods.

ON THE REDUCTION OF SILVER WASTE.

Reduction by Magnesium.—The reaction of magnesium upon the soluble salts of silver is one of the most energetic ones we could employ; but at the present price of magnesium it is out of the question, except for very small experiments, such as a quantitative method of estimation. However, the combining number of magnesium is so light that it goes a remarkably long way; thus, one part of magnesium will reduce nearly eleven parts of silver from its combinations. The actual numbers are as follow:—

$$\text{If } 12 : 108 :: a : x,$$

a being the quantity of magnesium used, and x being the unknown quantity of silver.

Reduction by Iron.—This excellent method of reducing silver is hardly known outside the extensive reducing operations performed in large mineral works; yet it is a good process, works easily, and the results are very fair if the precautions mentioned in this article be adhered to. The process is next to useless if we manipulate with ordinary iron; but now pure electrotype iron, free from sulphur, may be obtained, and pure iron will be found to work perfectly. Ordinary iron contains a large quantity of sulphur, which, in the presence of acid, gives sulphuretted hydrogen, and the sulphuretted hydrogen acting upon the silver forms sulphide of silver. A piece of pure iron is placed in the moist chloride of silver, to which has been added a strong solution of common salt, and the whole is acidulated with hydrochloric acid. The action quickly sets in and proceeds very rapidly, particularly if we introduce our old friend the piece of platinum foil. When the reaction is over the reduced silver should be thrown upon a filter and washed—first with a little dilute hydrochloric acid, and then with distilled water. The piece of iron—which, like the other metals, must be used in excess—should then be washed, dried, and preserved for a future operation. A quarter of an ounce of iron fully reduces one ounce of silver from its solutions.

Reduction by Soda and the Alkalies.—We do not understand why this excellent method of reducing silver from its solutions is not in more general use, and it is probable that the following practical details may, in a measure, facilitate the working by this process. We recommend, from sundry considerations, a solution of soda as being the most valuable and workable precipitant; but as the caustic soda of commerce is very impure we also strongly recommend our readers to prepare it themselves. There is now extensively manufactured a pure variety of carbonate of sodium to answer the requirements of the *Pharmacopœia* (not the ordinary "washing soda"). It is sold for a few pence per pound more than the common variety, and it is this article which is to be used. Take of carbonate of sodium twenty-eight ounces, fresh-slaked lime twelve ounces, and water one gallon. Mix them in an iron vessel, and bring the mixture to the boiling point. Transfer the whole to a bottle which can be closed, and next morning the supernatant liquor can be poured off for use. It may be considered chemically pure for the purposes to which we are about to apply it. Such a solution precipitates the oxide from the soluble silver salts, and will not redissolve the precipitate even if used in moderate excess. The chloride, bromide, and iodide of silver are also decomposed by a solution of soda, particularly if heat be employed.

The reaction is as follows:—

$$\underset{\text{Two eq. nitrate of silver.}}{2\,AgNO_3} + \underset{\text{Two eq. caustic potash.}}{2\,NaHO} = \underset{\text{Oxide of silver.}}{Ag_2O} + \underset{\text{Two eq. nitrate of sodium.}}{2\,NaNO_3} + \underset{\text{Water.}}{H_2O.}$$

Now we may either dissolve this oxide directly in nitric acid, or we may procure metallic silver by moist reduction, or again procure it by dry reduction, as each particular phase of operating may be found most desirable according to the special circumstances.

Thus presuming that no organic impurities have been carried down in the precipitate, we may dissolve it at once in nitric acid, providing it has been thoroughly washed with distilled water, and evaporating the solution down until a pellicle forms on blowing upon the surface.

If it be wished that we should obtain this silver in the metallic state it is only necessary to leave it rather strongly alkaline, and to add a little sugar. This mixture of oxide, sugar, and soda is then boiled from ten to twenty minutes, when it will be found to be reduced from the oxide to the metal. But such a product requires a most careful washing, and under many circumstances the product will be more or less impure. Oxide of silver, however, is converted by ignition into metallic silver; and if the operator has a suitable arrangement at his disposal this method eliminates all sorts of possible impurities. It must be borne in mind, however, that the process of ignition necessitates the drying of the oxide, which is not so necessitated in the method of moist reduction with sugar.

There are a few other methods of reducing silver from its solutions which are not in general use, probably from a question of expense, or some other important reason. Thus if a solution of ammonio-nitrate of silver be heated with aldehyde it is reduced to metallic silver; or the process may be reversed, and a solution of aldehyde-ammonia may be heated with nitrate of silver, when the same reaction takes place.

Oxalate of silver ($Ag_2C_2O_4$) is precipitated upon adding oxalic acid to a solution of nitrate of silver as a white anhydrous salt. It is practically insoluble in cold water, but dissolves in hot water. When dried it is instantly reduced to the metallic state when heated a little above the boiling point of water, but unfortunately with almost explosive violence; and, as it is rather erratic in its behaviour, care is required when experimenting with this salt.

We think we have given working details of all the processes in general use for reducing silver by the moist methods. To treat paper-clippings and other residues, it is necessary that they should be burnt in a large suitable vessel, and the metal reduced in the furnace, or the resulting ash may be treated with the proper solvents.

When we have procured our silver by any of the above-mentioned methods it may be converted into nitrate by acting upon it with nitric acid. Ten parts of water are put upon six parts of the precipitated silver, and five parts of pure nitric acid gradually added. On evaporation this should yield eight and one-tenth parts of nitrate of silver.

At some future day we intend to give a description of a properly-constructed furnace and of furnace operations generally when applied to the reduction of silver; but we have devoted a very considerable space to the consideration of the waste question, and therefore we must hold the other over until we have disposed of some of the more pressing matters now before us.

LANCASTER'S POCKET CAMERA.

It is not very easy to define what a portable or pocketable camera means in these advanced times, when compression or condensation is carried to such a state of perfection; but when a quarter-plate camera has been so condensed as to occupy little more than the bulk of a pocket-book and still retain its capability of expanding to the requisite extent, combined with rigidity, we imagine the force of compression can no farther go.

Mr. Lancaster, of Birmingham, has for a considerable period been devoting his energies towards obtaining a fulfilment of the photographic tourist's dream of a camera embracing the maximum of advantage with the minimum of bulk and weight; and that he has succeeded there is no doubt at all. Mr. Lancaster some time ago left with us a camera for crucial and critical examination, thus affording us every facility and ample opportunity for testing it under all conceivable circumstances. This we have done, probably, more thoroughly than the constructor anticipated.

The size of the plate determines the size of the camera; and when we are informed that a plate of such and such dimensions is to be used we know within a fractional part of an inch what must be the minimum dimensions of the camera. Whatever be the size of plate we are certain the camera must be a *little* larger, in order to allow space for the dark slide and the frame into which the latter must necessarily fit. It is in the matter of thickness and lightness the camera engineer has the subject so completely under his control.

The maximum size of Mr. Lancaster's camera for quarter-plates ($4\frac{1}{4} \times 3\frac{1}{4}$) now before us is, when closed up, one and a-half inch thick by $5\frac{3}{4} \times 4\frac{3}{4}$ inches. Its composition is reduced to the simplest possible elements, namely, a front and a back connected together by a bellows body. But, as it is essential that some means of keeping the camera distended be devised, this requirement has not been lost sight of in its construction.

The base of this instrument consists of a piece of brass containing a slot. One end of this is firmly attached to the front by means of two screws, the other being connected with the back portion by means of a screw which travels in the slot. This brass piece forms the "base-board" of the camera by which it is attached to the stand, and it serves to keep it distended to any extent required by the focus of the lens employed. The lens attached to the camera under notice is an exceedingly good one, of the achromatised meniscus form, and works in a tube and jacket fitted with a rack and pinion; hence, while the coarse adjustment is made in the camera itself, the "fine adjustment"—to use a term with which microscopists are familiar—is made by means of the rack and pinion of the lens.

We had purposed giving an engraving of this unique little camera; but from the description, simple though it be, we have given we believe that no illustration short of having the camera in one's hands could make that description more comprehensible. For the sum of fourpence, as we have determined by weighing the instrument, the camera may be sent through post enclosed in a sealed envelope; and a trifling additional amount will suffice to defray the expense of conveyance of the three double dark slides which form a portion of the complete apparatus.

We must add a few words with respect to the stand for this extremely portable camera. Mr. Lancaster has decided in favour of one which, when packed up, resembles an umbrella. It is composed of three brass tubes hinged at the top to the small platform, also of brass, which screws into the base of the camera; and as inner tubes slide into these outer ones, telescope fashion, the length may be inincreased to a considerable extent. This system is inferior in constructive principle to that in which each of the camera legs is split up and divides for the purpose of being attached to a triangle. From a mechanical point of view the latter is the most solid of erections of a similar character. But a broad base, and consequently a great degree of rigidity, may, we find, be imparted to the umbrella stand of Mr. Lancaster by adopting the expedient of attaching a piece of string to that part of the base of the camera farthest removed from the attachment to the stand, and fastening the end to the lower portion of one of the legs. Any person conversant with mechanics will at once comprehend that this amounts to *nearly* the same thing as the splitting up of the legs and attaching them to a triangle. With an arrangement of this kind all vibration—at least in one direction—is avoided. Probably inconvenience as regards vibration would be avoided if Mr. Lancaster were to invent some means by which the upper ends of the legs of his present stand might be opened a little, so as to present the advantages of a wooden stand attached to a triangle; and, from the well-known ingenuity of this gentleman, we have no doubt that his doing this would involve very little trouble.

Taken for all in all, Mr. Lancaster's pocket camera is a most admirable little instrument, being not only neat and portable, but really effective when used in the field.

In Dr. Nicol's *Notes from the North*, which will be found in another page, we observe that he alludes to a subject which at one time proved a source of disquietude to many professional photographers, but which has now, happily, in the majority of instances, been set at rest, especially in large towns. We refer to the subject of sitters paying in advance. This is a matter which photographers have in their own hands. It is only necessary that a rule be made—and be as strictly enforced as in the case of a traveller about to start on a railway journey—that no person be permitted to sit for a portrait until he or she produce to the operator or employé in charge a receipt from the cashier for the amount of the order. We know that such is the rule rigidly adopted in most of the metropolitan studios, as well as in many large towns and watering-places in England; and it is very evident that its rigorous adoption in every case when a photograph is to be taken would save a great deal of trouble and expense, besides ensuring an immunity from bad debts.

THEORETICAL MATTERS HAVING A PRACTICAL BEARING ON THE SENSITISING OF PLATES.

Theoretical matters have not, perhaps, much interest for practical photographers; but the necessity for some theorising is obvious, unless everything is expected to be discovered in a haphazard manner—an expectation which will never be realised. It is quite the fashion to "pooh-pooh" the theorist. Probably it is sometimes right so to do; still, on the other hand, it may be said that were it not for one theorist—I mean Dalton—most of the manufactures of this and other nations would have been in a far less advanced state than they are now found. So an ounce of practice is *not* always worth a pound of theory, and it is not always wise to ignore theory on the ground of its being such; the time for it to be thrown overboard is when it is not in accordance with facts. So much by way of digression.

It is a well-known fact in photographic practice that a bath does not give the best results until after a few plates have been immersed therein. Of course it is assumed that it has been iodised, so that such phenomenon is not owing to the solution taking up iodide of silver at the expense of the plate. No photographer would, or rather should, allow this. So here is an effect, namely, that it takes a short time to get the bath into the best working order, and for this effect there must needs be cause sufficient to produce it; and if that cause can be pointed out it is probable that such may be avoided, so as to enable one to produce a bath in the best working order at once. Here is a case, so far as I am concerned, where theory has been more valuable than practice. It is true that one might have stumbled across the means to the end by chance, but theory leads us to it in a way that possibly I may make clear to others. Previous, however, to doing so, attention must be recalled to the details of some experiments with baths which the readers of this Journal have had an opportunity of perusing in these columns some time back. I cannot just now lay my hands on the particular number; but the burden of the article was to the effect that, if a plate be sensitised in a weak bath, any subsequent immersion in a strong solution does not produce a plate giving such good results as one where immersion in a strong solution takes place at first—the image produced lacks that bloom which is so desirable a quality in a negative.

If this be accepted as a fact—and I imagine that a few experiments will convince the sceptical of its being such—there is some ground for theorising on it when viewed in relation to the admitted fact that a bath does not work in its best condition until a few plates have been dipped therein.

When a plate is dipped into a bath a double decomposition is set up, nitrates of the bases of the iodiser being formed along with the iodide and bromide of silver upon which the image is to be received, the ether and alcohol of the collodion mixing with the aqueous solution. We all know that ether is not miscible with water, but is so with alcohol; while alcohol is miscible with water in any proportion, and hence when a collodionised plate is plunged into a dipping bath-holder containing a silver solution in which there is no alcohol the tendency of things is for a layer of ether and alcohol to be formed in immediate contact with the plate, and the silver solution to be admitted to the film in such a state as to favour the formation of a layer of the bromo-iodide, such as is formed in a weak bath; in fact, a plate is produced such as might result from immersion in a weak, followed by a strong, solution. After a while, when a certain proportion of alcohol is taken up by the bath, it mixes more readily with the ethero-alcoholic film, and the best conditions are obtained.

If this be the cause—and in the writer's opinion it is so—the remedy is not very difficult to find. The first and most obvious one is the addition of alcohol to the bath previous to any plates being dipped therein. This has already been recommended by Mr. Sarony, but in his case for the removal of stains occasioned by the use of a new bath; and the connection between the staining of the film under these conditions and the absence of alcohol in the bath need scarcely be pointed out. Practically, under these circumstances, the addition of alcohol is right, and theoretically so too, if it were an advisable thing to accumulate in the bath. There is yet another way, and that is the use of a flat bath-holder, as under these conditions the tendency of the volatile bodies is to leave the surface of the plate at once, and not slowly stream against it as in the upright holder; for the holder recommended allows the strong silver solution to come immediately in contact with the film. A flat bath-holder has its disadvantages; still the almost total absence of ether and alcohol in the bath solution is not to be despised.

However, the end in view is accomplished if it have been pointed out what is the cause of a new bath solution not working well at once; and the selection of the remedial measures suggested is left entirely to the practical teaching the photographer may have had.

W. E. Batho.

THE ACTION OF COLOUR ON THE SENSITIVENESS OF SILVER SALTS.—DR. VOGEL AND HIS CRITICS.

Some months ago we presented to our readers an account of the experiments which Dr. Vogel had been making in the direction of the variableness of the action of the sensitive silver salts under the influence of different colours; and more recently Mr. M. Carey Lea, Mr. Spiller, and others have recorded some notes in the same direction. These latter gentlemen were unable to confirm the experience of the former, and it appeared as if, after all, there was nothing in it. Dr. Vogel, however, now returns to deal with the subject, and he says that the mode in which Mr. Lea worked vitiated his experiments, and that it is of no use to expose coloured films under coloured glass, for these will in nowise give the same results as when the plates are exposed to the spectrum. Pigment colours and spectrum colours are wide as the poles apart, and it is seldom that the action of both is alike. With the spectrum, for instance, red and yellow act as black and blue or white in ordinary portrait collodion, and it is said that the same coloured materials of any kind have the same effect. This is so in many cases, no doubt, but not in all. One of the best-known blues—the indigo of the Prussian infantry coats—does not come out white, but as dark as it appears to the eye. One of the best-known reds—madder lake—comes out nearly white; aniline red acts like white paper, while Naples yellow comes out not black but grey. And if this be the case with these colours it is just as likely to be the case with tinted glasses, so that in Dr. Vogel's judgment the test of Mr. Lea is no test at all.

All colour pigments are impure, and consist of more than one hue, although the human eye can detect but one; hence the necessity of depending upon the spectroscope, which will unravel these colours and set them forth in their order, as may be seen by examining any indigo or Berlin-blue-coloured surface by its means. Thus it is seen that in Berlin blue there is mingled a considerable amount of red, and that blue and violet are tolerably strong in the madder. The result of working with impure colours of this kind, therefore, is much the same as in working with impure chemicals. Dr. Vogel asks what Mr. Lea would say were he to set to and try his bromide process with bad collodion and bad everything; and he doubts whether that gentleman would think it worth his while to notice failures so patently obtained. Seeming to think that in his own case he would be justified in doing as he supposes Mr. Lea would, Dr. Vogel nevertheless proceeds to describe, for the benefit of his readers, the mode which that gentleman followed, and to hold it up to ridicule to a decent length. We have endeavoured to give his arguments without the setting.

Mr. Lea, it seems, prepared plates with aniline dyes as prescribed by Dr. Vogel, and, instead of exposing them to the rays of the spectrum to see whether the sensitiveness inclined towards one end of the scale or towards the other under the different colour loadings to which the film was subject, exposed them under glasses. Refuting this method of testing in the manner we have stated, Dr. Vogel next notes that Mr. Lea has observed the singular action of salicine in heightening the sensitiveness of bromide of silver for the red and yellow rays, although it is perfectly colourless itself and does not seem to absorb any colour in particular, and remarks that Mr. Lea has entirely overlooked the fact that it is such colourless bodies which yield the most powerful instances of absorption in the spectroscope—as, for instance, atmospheric air and watery vapour. Nitrate of silver is a colourless substance which, according to Dr. Vogel's experience, acts as an accelerator of sensitiveness for the violet and blue rays; and morphine, equally colourless, on the other hand, appears to raise that of the green, yellow, and red rays—phenomena which have nothing astonishing in them for those accustomed to note the colour-absorbing power of colourless bodies.

And there is another difference between pigment colours and those of the spectrum which has a very powerful influence on results besides that of purity, and that is their brilliancy. The yellow ray of the spectral image, according to Fraunhofer's and Vierordt's researches, is a hundred times brighter than the indigo, and, of course, a yellow pigment is wholly without this extra intensity. Let anyone compare the chrome yellow with the ultra-marine in Dr. Vogel's table of colours in his *Lehrbuch*, and it will be found, at the outside, that the yellow is not more than double as bright as the blue. Now it follows at once that if the comparisons have been made with a yellow colour fiftyfold brighter, and that, too, when compared with the blue of the spectrum, any parity of results between these and dull hues of this kind must be utterly fallacious. So much, says Dr. Vogel, for the criticisms of Messrs. Lea and Spiller.

More recently still Dr. Monckhoven has published, through the London Photographic Society, sundry researches in the same direction which have not been successful, and he has not confirmed Dr. Vogel's results. It appears that, as our readers may remember, Dr. Monckhoven used four flint-glass prisms, with condenser and soforth, with which he got a spectrum forty centimetres long, and that this was such an instrument as Dr. Vogel could not master, his being only able to give a spectrum six centimetres in length. But this great instrument has not, in his friend's esteem, given him the advantage, nor rendered him accurate either in recording his own observations or those which he was seeking to establish or refute. Quoting from Dr. Monckhoven's article in our pages (June 19, page 292), Dr. Vogel says he was not a little astonished to read that, according to himself, "a bromide of silver plate is only sensitive for the rays more refrangible than the green," and he calls it rather a strong misstatement of the announcement he made so distinctly in December last, in the *Mittheilungen*, that a *dry* bromide of silver film is sensitive as far as the orange. Dr. Monckhoven is further incorrect in saying that Dr. Vogel stated that "by adding to the bromide of silver any colour which absorbs a certain part of the spectrum the maximum of sensitiveness in the bromide will be found in this portion," for he never wrote that. He only said that coralline plates showed themselves *almost* as sensitive in the yellow rays as in the indigo. It is only with chloride of silver, and through naphthaline red, that the maximum sensitiveness gravitates towards the yellow. So also with the statement that Dr. Vogel used only a single flint-glass prism, the fact being that he employed a spectroscope *à vision directe*.

And when we turn to the record of Dr. Monckhoven's own observations they will be found, Dr. Vogel says, to be equally defective. He exposed *wet* plates to the spectrum, and found the highest sensitiveness at Kirchhoff's line 1450—that is, in the green ray; but he does not say whether the plates so treated were bromised or iodised plates. The first might be supposed, indeed; for he observes that bromide of silver in wet plates is not more sensitive to the green ray than iodide. He had tried fuchsine, coralline, Bismarck yellow, and what not, all with the same results—no sensitiveness for the yellow or red rays. As our readers will remember, too, Dr. Monckhoven stated that unless he had been misinformed he was not alone in getting these negative results; and he ran over the names of several places and men where and in whose hands the same conclusions had been arrived at, quoting, amongst others, those with whom Dr. Vogel has sought to deal in the remarks above given. Dr. Vogel appears quite hurt at his friend's rashness and inconsiderate heaping together of adverse authorities in this way, and especially so at the remarks which it has given rise to by some anonymous person in the pages of this Journal—no less a person, in fact, than our familiar "Peripatetic" friend, who has got an uncanny knack of talking about things in a way that is sometimes more pat than pleasant—to chuckle over the defeat which has seemingly befallen him, and by whom he is treated as first dead and then condemned; and if Dr. Vogel can establish his position he has decidedly cause to cry "hold!"

With the objection of the "Herren" whom Dr. Monckhoven cites Dr. Vogel cannot deal, because he has never seen them; but he has, fortunately, still Dr. Monckhoven himself as a help towards clearing himself. That experimentalist guesses that the singular phenomenon observed by Dr. Vogel in regard to the red rays must be due to the action of diffused light which, streaming through the prism, has acted on the sensitive plate, and says that he is "quite convinced that Dr. Vogel's plates do not show the double line D, nor the line C, nor the lines B and A of the solar spectrum." "But," says Dr. Vogel, "I have, beyond all doubt, photographed the lines Q, D, C, B and *a*."

Further: Dr. Monckhoven says:—"The publication of a photographed spectrum in one of the journals is the most practical plan for Dr. Vogel to pursue in order to decide whether he has discovered a new process or not; for a photographic spectrum of these—the yellow and red—regions of the spectrum would be proof beyond cavil of the results stated to have been obtained by him." For this hint Dr. Vogel expresses himself very thankful, and promises to publish several such forthwith to prove what he asserts.

Meanwhile he must have a word upon Dr. Monckhoven's inconsequent conclusions. Dr. Monckhoven used a slit of one-thirtieth of a millimetre opening, Dr. Vogel one of one-fourth of a millimetre, consequently the spectroscope of the former got seven and a-half times less light than that of the latter. On the other hand Dr. Monckhoven weakened his spectral image by drawing it out to forty centimetres—that is, seven times longer than Dr. Vogel's—so that the brightness of his image was just fifty times less than it should have been to have enabled comparisons to be equal. For instance, and further: Dr. Vogel required an exposure of some fifteen minutes and never less than three; and if Dr. Monckhoven is to get the same results with his less light he must expose 150 minutes, but instead of that he exposes *two* minutes. So far the blundering is obvious enough, but his mistakes in dealing with colour-loaded sensitive plates have another cause besides that, as it is quite evident that he has coloured his plates too much; for, as every bromide particle lies surrounded with colour in a tinted film, if the colour be too strong the rays are too much absorbed thereby before it gets acted upon by them. At first sight the contrary might seem to be the case; and one is inclined to believe, as Dr. Vogel was, that much would here help much, but it is not the case. Dr. Vogel prepared four plates—Nos. 1, 2, 3, and 4—of which each was half as weak as the previous one from the first downwards, and what was the result? Why, simply that the weakest-coloured showed the strongest action of the yellow rays, and the strongest-coloured showed no action at all. So far well, Dr. Vogel; but supposing this to be true, would it not be the best of all possible plans not to put any colour in at all? We speak with diffidence and under correction, and our business is, in the meantime, to lay the gist of this argument fairly before our readers. This thus far we have done, and Dr. Vogel does not now go any farther; but he promises to return to the charge forthwith, and will, no doubt, make out a much better case for himself than at the first blush may have appeared.

NOTES FROM THE NORTH.

I suppose there is hardly a limit to the application of photography. Scarcely a week passes in which we do not hear of some new use to which it is being put, until we almost feel certain that it has got to the end of its tether at last. Such, however, is not likely to be the case for a long time. Its importance as evidence in our law courts has been duly recognised and there largely used; in medicine it is rapidly gaining ground as an educational agent; and now we may fairly expect that it will be equally useful in theology, "photography in the pulpit" being the latest novelty in connection with our art-science.

"Photography in the pulpit!" some of my readers will exclaim; "how, in the name of all that is wonderful, can photography be made available there?" Well, I will tell them. On the afternoon of Sunday last the popular minister of one of our best-filled city churches brought, or rather got the beadle to bring, into the pulpit, along with the big Bible, a photograph of Holman Hunt's picture, *Behold I Stand at the Door and Knock*, taking it for his text, and, pointing out item after item of detail, preached from it one of the most stirring and impressive sermons I have ever heard.

I hope the example thus set will be largely followed; and I am persuaded that reliable pictures of the various scenes of Bible history would be valuable aids in fixing the incidents on the minds of the hearers. Will some of my readers take the hint, and at once set about making suitable pictures, trusting that the supply will produce the demand?

Several correspondents have called attention to the necessity which exists for photographers protecting themselves from the unprincipled people who sit for their portraits, get proofs sent home, and never think of having their orders completed, or paying for the time and *matériel* thus used. I had thought that such an objectionable practice was confined to a class against which it would be easy to guard oneself; but, if we may judge from the report of a case recently tried in the sheriff's court here, the trick is occasionally tried on by some whom society generally considers its *respectable* members, and the tricked photographer has a difficulty in legally obtaining the redress to which in equity he is entitled. As the case is of considerable interest to photographers generally, I propose to state the simple facts, which are briefly as follow:—

Sometime in March last, two well-dressed and respectable-looking ladies called at the studio of Mr. Asher, and, after examining specimens and agreeing as to prices, card and cabinet portraits were ordered, and the usual sittings took place. Duplicates of both sizes were taken, and it was arranged that a proof from each negative should be sent, from which they were to select how the order should be completed. At the conclusion of the sitting Mr. Asher's business manager said that they generally required strangers to pay the amount of the order at the time of sitting, to which the ladies replied that they had not their purses with them, but gave the name of Mrs. Miller, and the address 6, Great Stuart-street, promising to call in a day or two to pay the amount. The address given being in one of the aristocratic streets of the city, the manager naturally thought it was all right, and the proofs were sent in due course. Two months, however, passed, and nothing further was heard of the ladies; in fact, Mr. Asher had altogether forgotten the circumstance, when a messenger called offering to pay a small sum for the proofs which had been sent. This was, of course, refused, Mr. Asher saying that he did not conduct his business in that manner, and that nothing less than the full sum agreed on would be accepted. A week or two subsequently payment was applied for, and then he learned that 6, Great Stuart-street was the residence of a Mr. Hogg, who was the father of the ladies, one of whom was a Mrs. Miller, residing in Liverpool, the other at the time of the sitting being unmarried and living with her father, but since married and residing elsewhere. Several applications for payment were unsuccessfully made, and at last Mr. Asher applied to the father for the addresses of his daughters; but that information was also refused. Mr. Asher, then, to try the case, summoned the ladies' father, Mr. Hogg, to the sheriff's court, on the ground that as his daughters were, at the time the contract was made, residing with him in his house he was bound to pay their debt or, at least, to furnish their addresses, so that Mr. Asher might have an opportunity of claiming payment from their husbands. When the case came on the Sheriff asked pursuer's agent if there was on record any similar case, as the matter was somewhat difficult to settle, and proposed to adjourn the case for a week, in order to give time for the search, expressing at the time a hope that it would be settled out of court. When the case came on again the pursuer's agent stated that he had been unable to find a precedent, and that the defendant still refused to give up the addresses of his daughters. Whereupon the Sheriff remarked that he entirely sympathised with Mr. Asher, as it was a hard case for him to lose his time and *matériel* in the way proved in evidence, but he had no recourse but to give a decree in favour of the defender; he should, however, certainly not allow him costs—a judgment which most readers will consider to be morally in favour of the pursuer.

Since writing the above I have heard the sequel of the story. Mr. Asher was a few days ago in a neighbouring town, and, during a conversation with a photographer there, learnt that a somewhat similar case had occurred with himself in connection with the same ladies, and was by the photographer furnished with the much-wanted address; whereupon he lost no time in applying for payment of his money, and this time the application was successful.

Photographers generally should take a hint from this, and follow the example set by Messrs. Ross and Pringle, who, I see, have within the last few days placed in their dressing-room a notice to the effect that strangers must always pay in advance.

Photographers who set a high value on their negatives should look to their insurance policies. I was appointed by one of the insurance companies recently to report on the claim of a photographer at whose establishment there had been a slight fire, and he was somewhat astonished to find that, in consequence of a provision in his policy, the highest sum he could claim for any negative was two shillings and sixpence. This stipulation will, I believe, be found very general, and is, I think, perfectly just on the part of insurance companies; but I think also that it should be more generally known, and that all who have negatives of value should, by the payment of a higher premium, secure themselves as far as possible from such serious loss. JOHN NICOL, Ph.D.

Our Editorial Table.

THE PRACTICAL PRINTER: A COMPLETE MANUAL OF PHOTOGRAPHIC PRINTING. By CHARLES W. HEARN.

Philadelphia: BENERMAN & WILSON.

IN a closely-printed octavo volume of 192 pages devoted exclusively to the subject of the printing of photographs we naturally anticipate finding the matter very fully treated. It is a considerable period since we rose from the perusal of a new book on photography with feelings of greater satisfaction than in the present instance; and we appreciate the author as a writer not only thoroughly conversant with the subject, but as very willing to impart to those less skilled the knowledge he possesses, and who, happily, has also the ability to do this in a singularly lucid and attractive manner. There are over fifty diagrammatic illustrations, and a photographic frontispiece by Gutekunst—a cabinet portrait of a boy posed in an easy and effective manner, and printed in a deep brown tone just verging upon violet.

We observe that in the various formulæ given for sensitising baths Mr. Hearn recommends the addition of other nitrates than the nitrate of silver, and further that the bath be slightly alkaline. Nitrate of ammonia or soda is added to the silver bath in quantity nearly equal to that of the silver present; for instance, a bath containing forty grains of silver to the ounce contains also thirty-five grains of the nitrate of ammonia, and sufficient of a saturated solution of bicarbonate of soda or of liquor ammonia to render the bath slightly alkaline. For winter use the strength of the nitrates is to be increased.

As regards the fuming of paper with ammonia, the author claims for it the following advantages:—the paper prints richer, quicker, and more brilliantly; the prints tone more easily, and the tones of the finished pictures are much more pleasing and satisfactory. Full directions for fuming are given. From these instructions we learn that the presence of chloride of lime in the fuming-box is advantageous, inasmuch as it prevents the paper from turning yellow whilst being fumed—a common occurrence during hot weather—and also improves the printing qualities of the paper, giving a virgin whiteness to vignettes, and preventing their discolouration after printing, when the discolouring occurs only from the heat of the printing-room. Mr. Hearn, of course, recognises the chemical union resulting from the mixing together of the chlorine and the ammoniacal fumes.

Referring to the process of preserving sensitive albumenised paper, published by Mr. J. R. Johnson in our ALMANAC, the author, after trying it, says:—"I have, since preparing it, kept it up to the present time, full two months, in excellent condition, and, judging from the prints I have made on it, I see no reason why it should not keep for the full time he says (eight to ten months) in excellent working order."

What treatise on photographic printing would be complete without an adequate portion being devoted to the all-important topic of toning? Mr. Hearn treats this subject with much fulness, imparting value to his observations by a variety of formulæ, and has added practical instructions for the guidance of operators, supplementing the more purely executive portion by some observations on "artistic toning," which contains such a happy admixture of early experience in toning and valuable æsthetic observations that we present it as a specimen of the author's style:—

ARTISTIC TONING.

As a rule, in toning the prints, the following will, as a general thing, answer admirably:—"Tone the prints just as you wish them to be when done."

Looking over a journal one day, in my earliest days at printing, I saw an article headed *Artistic Toning*, and upon reading it I learned several things about toning, and one little clause was the one above quoted. This clause seemed to me to be very important to the young printer, and I wondered at the time why I had never been told that, and I immediately knew upon reading the above clause that I could tone, and so I determined to tone a batch of prints as soon as possible; and one rainy afternoon, when the printer did not appear after he went to dinner, I resolved to do the toning myself without saying a word to the employer about it. So I made the bath as I had seen the printer make it a score of times before, warmed it slightly, let stand a few minutes, cut, washed, and acidified the prints, washed again, and then commenced to tone them, toning *three* at a time, and as there were only fifty to be toned, being all that had been printed on account of the darkness of the day and the scarcity of the negatives, I did not doubt but what I could tone and fix them all without help. This was the first batch of prints that I ever had the complete management of the toning and fixing of, and I determined to let Mr. L., the employer, and Mr. B., the printer, know that *I could tone*. With anxious eyes I watched that *first batch* of prints, in fact I *glared* at them, and when they arrived at that stage that I wished them to be when finished, I took them out and set them to washing in running water. When my next batch of prints was almost toned I placed in the bath a print that was *not toned*, and compared the two, upon doing which I found that I could tone much better. I toned them all finally, fixed, and set to washing.

When through, the "boss" happened to think that there was "*no toner upstairs*" (so he expressed it, as I afterwards found out), and he came rushing up where I was, to tone the prints before it got much darker, for the weather was lowering, and it was getting dark pretty fast. I told him that I had toned, and he expressed his surprise and inquired, "Are any of them good?"—a question which I did not think very complimentary, I assure you. I told him that I thought quite a number of them were good, and when he, upon looking at them, told me that they were "*very nice indeed*," I felt bigger at the time than I ever have since. I asked the printer, Mr. B., the next morning, how the prints were toned, and he said "very well, only they were toned a little uneven," and, upon his showing me what he meant, I determined, as a natural consequence, to do better next time. That little clause led me on, in time, to do the toning in that and other establishments, and more for the reason of showing a young beginner what he can do by a little reading of how *another beginner* did, has led me to write this short sketch of my first attempt at toning.

From the above you see that the idea in toning is to tone the prints until they look as you wish them to do when finished, and that toning, in one respect, is not a question of time as fixing is; for you remember that the printer, when he *fixes* his prints, makes up his solution of a certain strength, which he makes sure of by tasting, and then he times them, and lets them remain in the bath so many minutes. Now, the toner who takes five minutes or so to tone a batch of prints would give the impression to the beginner that it was a question of so many minutes, as it is in fixing prints; consequently I have here taken special pains to contradict this erroneous thought, so as to prevent the novice from beginning wrongly, as he would be apt to do if he were in a place where the printer or printers would not take any pains to show him, but would be constantly in a hurry to get through as soon as possible.

Now, since you are to tone the prints as you wish them to look when finished, let us see if you have the *right idea* in your mind as to how they should look when toned. You should not wish to have them what may be called "*red tones*"—that is, to have the background, draperies, hair, and the *face* as red as a brick, or, in fact, anywhere near it. You should not tone them so that the draperies and shadows look *blue*.

Rule: *You should tone until the face is slightly blue, and then the prints should be taken out, even if the rest of the printed paper is quite red.*

With some baths, especially such ones as the acetate of soda and the bicarbonate of soda baths, this can be done very easily and successfully; but there are some baths—as citric acid, chloride of lime, &c.—with which this treatment cannot be used so well, and in the case of the citric acid toning bath the shadows also will have to be regarded, else the whole print will be as red as a brick. But a little experience in toning with any one bath will give you an idea as to how far you should tone before you discontinue the operation, and set the prints to washing. You may say that what I have just written will conflict with the rule given above; but *it does not*, for the only difference is this—with one bath you can *tone full strong*, and with another one, when the proper state has arrived, the prints should immediately be removed, and *should not* be allowed to remain in the bath until the tone has reached the *more decided stage*. In baths containing either the acetate or the chloride of sodium, or both, in their composition, the above rule should be strictly carried out.

The beginner should also bear in mind that he should endeavour to *tone even*. By toning even I mean to *tone all prints of the same person alike*. Some of my readers might say that it means *to tone the whole batch of prints to the same tone or tint*. Now, I suppose that this could be followed out, but would it be called "artistic toning" to tone blondes, blondines, and brunettes all the same tint, and make the light hair in one print *red* when it is not; black hair in another one *red*, and red hair *black*, &c., &c.?

You may say that *red* hair takes *black*, which it surely does; but if it lie in the power of the toner to tone the hair *red*, at least a little so, should he not do so? Another person may have black hair; should not the toner get a good dark-brown tone on the print, so as to make the hair look black (which it will do when the print is dry), and thus make the print more in keeping with the original? Should not a blonde have her hair look light in tone, and neither red nor brown, but about somewhere half-way between? The negatives of the last-named class of subjects are generally so made that when you tone the face, as per rule given above, the hair will be all right. So it is generally in by far the majority of cases, the yellow and red hair being exceptions. Of course you cannot obtain, and I doubt if you wish to, *yellow tones* for the hair; but if such hair is taken nicely in the negative it will very often come round to the right tint in the print, without making the rest of the print appear at all yellow, but of a light brown tint. While writing this I have in my hand such a print, wherein the hair is of a faint yellow tint, and the draperies, background, &c., are of a rich brown tone. I have obtained many such tones as this one by the use of the citric acid toning bath.

Excellent tones for the red hair, with clear high lights and half-tints in the face, are easily obtained with a bath containing chloride of sodium in its composition. The young beginner might obtain a few ideas by the close perusal of the preceding remarks about toning baths.

You might say that it is a difficult thing for a toner to tone his prints in the style spoken of above, and also that he cannot tell when the hair should be a decided red, black, or medium, on account of his never having seen the original. For this reason it is advised by some photographers that the operator should do the toning, as he knows more about the "style of beauty" than the printer who never sees the original. As far as lies in the printer's power he should tone the prints as nearly as he can to their proper colour, and his guide should be the original. A lady, who was the possessor of "*lovely* (?) *auburn hair*," once said to a photographer—"Why! you have made my hair *jet black* when it is *auburn!*" "Yes," said a friend; "they have made your *lovely hair black sure enough!*" Red hair was the fashion at that time. I know of many first-class photographers that dislike the red tones for the reason, as I have heard them say, "they are not artistic." An excellent photographer in Boston, Mass., once said to the writer—"I dislike the red tone, because it makes the hair of some people red when it is jet black, and I never let my toner tone so red as to make the hair look at all so, but I request him to obtain a rich brown tone to his prints, and then they will be more in keeping with the original in the *majority* of cases."

There is a great diversity of opinion among first-class photographers about the proper kind of tones to be obtained, as many of us are aware; and would it not be better for us to go by the advice of those more skilled in the art than what some of us are? I myself have always admired the German portrait stereographs, the tones of many of which I think are perfect. It is not only in the portrait work that this toning is to be so observed, but it should be more so in landscapes, marine views, &c. Always tone them more than you would portraits, as red tones on views are abominable, and then by toning them a *rich brown* the finished print will look as the views do in nature, and trees, rocky bluffs, fences, wood-piles, water, logs in water, reflections in the water, steamers, &c., will all be delineated in the print with wonderful fidelity. I have in my hand at the present moment one of the best-toned stereoscopic photographs I ever saw. The beauty of its tone consists in its perfect trueness to nature; at least, it is as far perfect as lies in the power of the toner to make it.

Artistic toning of stereoscopic views can be seen by examining a collection of Kilburn Brothers, Littleton, N.H., and artistic toning of portraits by examining those of Fritz Luckhardt, of Germany, Sarony's Gurney's, Howell's, &c., of New York. It would be a good thing for the young beginner to get his employer to purchase for him a dozen or so assorted prints from those galleries. I did so, and from the study of them I derived considerable knowledge, besides much pleasure.

Weak prints should be toned in a very weak toning bath, as when the bath is very nearly exhausted, and *face up* in the solution.

Intense or hard prints should be toned quite quickly in a strong bath, and *face down* in the solution.

Prints face up in the toning bath tone slower than when face down.

Weak prints, in all solutions, should be subjected to mild treatment.

A black tone is obtained by toning full strong in almost any bath if it contains a trace of chloride of lime.

A chocolate tone is obtained by toning a little longer than you would for a red tone, in almost any bath except the chloride of lime bath, and sometimes it can be obtained in this bath in a greater or less degree, according to the quality of the negatives.

A decided brown tone is obtained by toning a trifle longer than you would do to obtain a chocolate tone.

To obtain a purple tone you should tone between a chocolate and a brown until the print commences to show the *least possible signs* of this tone, then take it from the bath, and fix and wash, and when it is finally all finished it will be purplish in tint. The "sal soda bath" is excellent for these kind of tones, and they are quite easy to obtain, especially if the prints are strong, bold, and possess good toning qualities. A nitrate of uranium bath is also excellent.

A blue tone is obtained by almost any bath; but a good, clear, and pretty blue is a little hard to obtain, unless the negatives from which the prints were printed are excellent ones, containing good toning qualities.

The bicarbonate of sodium is an excellent bath to obtain rich blue tones.

All of the above tones are obtained more by removing a print at certain stages of the toning from the solution than by any particular bath, although some baths may be better than others for producing particular tones. It is, in a great measure, however, simply a matter of taste and experience.

The *Practical Printer* is well "got up," and the work cannot fail of being acceptable and useful to all classes of photographers—the veteran as well as the tyro in our art-science.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF FRANCE.

At the July meeting of this Society the chair was occupied by M. Davanne, Vice-President of the Council of Administration.

The Secretary proceeded at once to read the correspondence. This did not contain anything of very great importance.

A gentleman in Montauban sent a sample of gun-cotton which would dissolve in the proportion of twenty parts of cotton to the hundred of alcoholised ether, and promised to send more for trial.

The Chairman said that no report could be given upon it unless the Society knew how it was made. Members, however, might try it in their private capacity if they liked.

M. Vidal wrote promising some further specimens of his photochromy, showing the progress he had made; these specimens had, in fact, arrived, and showed that advance had been made.

A letter was then read from M. Geymet, claiming priority of invention over Herr Obernetter in regard to the plumbago process. He claimed to have indicated the process two years ago, having demonstrated it at a meeting of the Society. It had been, moreover, described at length in the *Bulletin* for 1872, page 185, and in his *Treatise on Photography*.

The meeting upheld M. Geymet's claim, the greater part of those present remembering the demonstrations. [If we are not mistaken, however, Herr Obernetter does not claim to be sole inventor of the process, if inventor at all. What he does say, and what nobody appears to dispute, is that he has made the process a complete success.]

M. Gobert exhibited some fine prints which he had brought from England, and which he owed to the courtesy of Mr. Baden Pritchard, of the Woolwich Arsenal. Mr. Pritchard has, as we some time ago stated, undertaken the reproduction in carbon of divers pictures taken during the Crimean war, and which have become almost effaced, and his endeavours have been crowned with success. The process he employs is analogous to that described by M. Gobert last year. He said that Mr. Pritchard had been able to utilise with success the persistent action of light upon the bichromatised films after exposure. He had seen fine impressions obtained simply by a delay of a certain time being allowed after exposure and before development. This was contrary to the experience of several members, and could, in the speaker's opinion, be due only to some difference in preparing the paper. Mr. Pritchard's is a ready-prepared commercial paper, which is sold in rolls, but as to what its composition was M. Gobert could not say.

The Secretary extracted from *Dingler's Polytechnic Journal* a method of making paper impervious to water, which may, perhaps, be useful to makers of apparatus. If a sheet of paper be plunged for a moment into an ammoniacal solution of copper, and then put on a cylinder and dried, it becomes perfectly impermeable to water, to which it may be exposed at boiling point without losing its consistency. When two sheets are wound round a cylinder together in this fashion they adhere perfectly together, and if a number be thus superimposed cardboards of great thickness may be made, of which the cohesion and resistance may be increased by interposing fibres or tissue between the layers. Boards thus prepared will not yield to wood in solidity. The ammoniacal solution of copper is prepared by treating copper filings with ammonia of density 0·880 in contact with the air.

After sundry extracts from the English journals had been read, the report of the Exhibition Jury was brought forward, but there is little in it to add to the summary which we have already given our readers. It speaks enthusiastically of the artistic and scientific progress of the art since 1870, and commends highly the many foreign pictures with which the exhibition has been adorned. We have already given a list of the medal awards.

At the conclusion of the report,

M. Roussillon expressed his deep obligations to the Society for the exceptional honour conferred upon him, and said that it would be the best method of thanking the Society to persist in yet further improving the heliograving process identified with his name. That progress was being made therein could be conceived by some samples of reproductions of the *Louvre* statues, which he handed round, and which excited lively admiration. Turning to another matter, he (M. Roussillon) said that he had observed in the last *Bulletin* a method for removing films from the glass without taking off the varnish. In his opinion this was a bad plan, for the varnish, collodion, and gelatine made a film of such thickness that it was impossible to use a negative so turned. They would find that there was almost as much loss of sharpness by this plan as if they used the negative by putting the paper at the back of the glass without detaching it at all. All those processes, he further said, which they saw in foreign journals were merely those published in 1870 by M. Jeanrenaud, whose name was too much put out of sight by pretended inventors. The one which he himself was about to detail was only that, and was in use daily in his operating rooms, where it was found as easy to detach a film of three feet square as one of the smallest size. The operation was so simple, and at the same time enabled glass to be so much economised, that, in his (M. Roussillon's) opinion, it was amazing photographers did not more generally resort to it for those negatives they wanted to keep. The method was to dissolve two drachms of caustic potash and twenty-five grains of carbonate of potash in about sixty ounces of water, adding afterwards about 180 ounces of alcohol at 40° B. (The details of this process were published in The British Journal Photographic Almanac for 1873.) Lac varnish disappeared rapidly under the influence of this liquid. Sœhnée and other similar varnish demand a little more potash. When the varnish has been completely stripped off the plate must be washed, and placed for a short time in a bath of distilled water containing ten per cent. of hydrochloric acid. From this it must be withdrawn as soon as the corners of the film show signs of rising, washed, and set up to drain. When the film has become quite dry put it over the vapour bath till it becomes covered with minute globules of water (this operation is of great importance); then pour over it a thin film of gelatine composed as follows:—Take three and a-quarter ounces of gelatine, dissolve it in twenty-five ounces of distilled water, and add about three and three-fourths ounces of glycerine. In winter the dose may be smaller. When well mixed pour into this solution five ounces of a solution of ten per cent. of chrome in alum water for each three ounces of gelatine. This done the film should be completely dried, and then covered with a layer of plain collodion, prepared with castor oil, and dried once more. When this has been accomplished run a knife round the edges of the plate and the film will come away. In practice M. Roussillon always varnishes his negatives, whether intending to reverse them afterwards or not, because he always takes some prints to begin with in the ordinary way, in order to test their qualities, and by that means often avoids mistakes. If they should happen to have some little holes in need of retouching these spots should be coated with a little ox-gall before gelatinising, to prevent the water or the gelatine from washing the retouching away. M. Roussillon concluded his interesting communication by handing round two large cases filled with blotting-paper sheets, holding between them a number of films which had been removed in this way, some of them a metre square.

M. G. Fortier produced a plate of zinc on which was a photographic print, and another engraved for typographic printing, and remarked that, whatever care might be devoted to obtaining prints by means of gelatine by any process, he had found by experience that it was never possible to get a fineness equal to that got by using bitumen of Judæa dissolved in benzine. The film must be very thin, or else it was very difficult to get sharpness. Of course a fine negative is required, with lights and shadows very crisp. Those strengthened with sulphate of potash always show a slight encroachment of the shadows on the lights, and the lines are rough. The best results are got with a very clean, rather thin, and very sharp negative. The bitumen of Judæa takes the ink well, or resists acid when a mordant process is in question. It is best adapted of all substances, in M. Fortier's opinion, for reproducing line engravings.

M. Gobert confirmed this opinion. He always had recourse to it in reproducing engravings. He put it on the plate while revolving, thus obtaining a very fine and uniform film, and developed with essence of turpentine, which in winter should be warmed.

M. France said that bitumen often gave granulations, and that those were due to water in the benzine. Anhydrous benzine never gave such results; but this opinion was not upheld by the previous speaker, who said he had never observed the granulation, although he used the ordinary commercial benzine and turpentine.

M. Despaquis had used bitumen of Judæa for engraving on glass, and had obtained a solution by dissolving the bitumen in one-fourth part of chloroform and three-fourths of benzine in summer, and one-third of the one with two-thirds of the other in winter. For giving solidity he used an ink having a base of caoutchouc.

M. Despaquis then went into a lengthened description of his process of *retouche interposée* applied to enlargements. This process, he had said at a previous meeting, could be worked in a few minutes by anybody, and this he now wished to prove. The method appears to us to be curiously clumsy, but we will give our readers a brief idea of it:—Suppose the photographer is going to take an enlargement in the ordinary way, and has duly focussed the image of a small positive on the ground glass; instead of at once taking an impression of this image on the sensitive plate a sugared glass is put into the place of the focussing-screen. It is made by simply putting the glass in a bath of sugared water. If dry this glass is breathed upon until faintly tacky, and then worked over by the photographer, according as the appearance of the picture demands, with a brush or stump, so as to correct irregularities. Plumbago is used if the negative is to be used in lithographic reproduction, and some blue or light-transmitting colour if it is to be used in light printing. This all done the touched plate is placed in a special groove inside the camera at a suitable distance within to prevent its throwing a sharp shadow on the focussing-screen, and then a sensitive plate is inserted and exposed in the usual way. Then there is obtained on one plate the image of the original picture mingled with the corrections of the artist. In M. Despaquis' hands this singular conglomerate appears to have succeeded, for he exhibited an enlargement of remarkable vigour done in this way. It is easier to retouch an intermediate plate in this way, he says, than to cure the evils in the minute negative from which the enlargement is made; and it may be so, but it is clearly not a plan that any photographer can carry out in a few minutes.

This finished the business of the meeting, and it would have been the usual course to adjourn till August, but the attendance was so small, and so many members appeared to be otherwise engaged, that it was proposed to adjourn at once till November. The proposition was carried with enthusiasm.

The *Moniteur* records a hearty vote of thanks passed by the *Société de Secours Mutuels des Employés en Photographie* in acknowledgment of the services which Dr. Napias has rendered to the profession in the publication of his articles.

BERLIN PHOTOGRAPHIC SOCIETY.

At the second May meeting of this Society the chair was occupied by Dr. Vogel, who, after the usual admission of new members, laid his new book on the table, the title of which is *Die Chemische Wirkung des Lichtes und die Photographie in ihrer Anwendung auf Kunst, Wissenschaft, und Industrie* ("The Chemical Action of Light and Photography in their Application to Art, Sciences, and Industry"). If we mistake not, this is the volume which he engaged to write for the international scientific series projected by Mr. Herbert Spencer, and published by Messrs. H. S. King and Co., so that we may expect shortly to see it in its English dress. [In passing, it may be noted that a volume of some interest to photographers has recently been issued in that series by Professor Cooke, of Harvard College. It is called *The New Chemistry*, and is said to be the best *résumé* of chemical research in existence—clear, systematic, and compact.] Dr. Vogel further mentioned that Herr Remelé, photographer to the expedition for the exploration of the African Great Desert, organised by the adventurous traveller, Dr. Gerhard Rohlfs, who traversed Morocco some ten years ago, and was almost literally hacked to pieces on his way back along the edge of the desert, had returned. Letters received from members of the expedition bore testimony to the energy with which he had carried on, not merely his photographic work, but whatever else fell to his hand. Photographs of the country, ethnographic memoranda, inscriptions, and soforth, had been secured by him. Burgsch, the Egyptologist, has found material confirmation of recent conjectures in the photographs which this gentlemen has brought home; and Dr. Schwernfurth, the patient scientific explorer of that "heart of Africa" which lies west of the White Nile basin—whose beautiful book may be known to many of our readers, and, if not, should be—speaks of the great exertions with which Herr Remelé managed in two days to photograph a temple. We shall look for these photographs with some interest if Herr Remelé has really been through the Great Sahara.

A short conversation then arose over M. de Constant's remarks as to the noxious effect of tobacco ash upon the silver image, and several inveterate smokers stood up for the character of the "weed."

Herr Braun said he had smoked over damp silvered paper, and never saw any bad effects from it.

Herr Prümm pointed out that it was not the smoke, but the *ash*, which was said to do harm; and therefore it might be quite true that, with reasonable care, a smoker might so smoke without harm appearing.

The Chairman offered some observations with a view to directing attention to the probable effect which varnishes had upon the permanency of the negative film. The point was of importance, in view of the coming transit of Venus; any yielding or cracking of the film might utterly destroy the value of a measurement.

Herr Prümm repeated his old recommendation that the film should be coated with yellow dextrine before varnishing. In his opinion it was a very good preventive of cracking.

Herr Lindner did not find in his experience that the varnish made much difference. Results were much the same in all cases.

The Secretary held that the origin of the evil was largely to be found in the glass. He found that these marks troubled him most with plate glass.

Herr Prümm called attention to the solution of yellow shellac in a concentrated solution of borax. Before being added to the borax solution it was well to treat the shellac with a dip in bicarbonate of soda. By this varnish he (Herr Prümm) got a "matt" surface suitable for retouching, and which could be afterwards revarnished upon.

The Chairman said that he had tried the plan and found the surface very easily impaired by damp fingers.

Herr Malmberg (who is a member of the Russian expedition for observing the transit in East Siberia) said that he intended to avoid all the difficulties attending the varnish question by not varnishing his plates at all; he would simply protect the surface of the film by superimposing another glass upon it.

The CHAIRMAN said that the danger was that the unvarnished collodion film might become detached from the glass. Everybody knew how slight a hold such films often had upon a plate-glass surface, and in that relation some remarks of his on the influence of collodion on the stability of the film might not be out of place. He demonstrated, in a paper to which we shall refer more at length, that a very slight contraction would suffice to make calculations of a delicate kind very faulty; and he recommended, in particular, that a very thin solution of caoutchouc should be used for coating the plate instead of the usual albumen. Strong india-rubber solution was not good, but a weak one afforded excellent results. He used one part of india-rubber to a hundred parts of chloroform, and then made a very workable film by adding to that ten times the volume of the solution in light benzine and filtering. With this he coated his plate before collodionising. The plan was the more to be commended now that so many complaints prevailed of non-success with the albumen coating.

Herr LINDNER always albumenised his plates, and never found any harm come of it. He observed that such plates showed very little disposition in films to contract, and he wanted to know whether benzine had no injurious influence.

The CHAIRMAN said none in the least; it entirely evaporated.

The failures which so frequently torment the users of albumen coating were set down by the Chairman and others to the development of minute fungi which are fostered by the plates being kept in a damp place.

The conversation then drifted into the region of the *Venus durchgange* and the processes which would be used in registering it. The Fothergill process was mentioned, and the morphine was declared to be the one that Herr Malmberg would use.

Herr Talbot exhibited half-a-dozen very remarkable enlargements produced by the Autotype Company in London. They were done in pigments from small landscape negatives. The same member also showed a very simple and practical kind of American wooden clip, which, instead of the spiral spring and hinge, had a spring plate which answered in place of both, along with sundry other nicknacks, amongst which was a barometer which showed alterations in the weather by change in the colour of slips of paper.

Mr. E. L. Wilson, of Philadelphia, and Dr. Hornig, of Vienna, were then announced as candidates for the honorary membership of the Society; and an eulogium was passed upon each gentleman, in which the work they had done and were doing for photography was fittingly set forth. Their admission was passed by acclamation.

Burnishing machines seem to be the order of the day now. They meet one at every turn, and always, when one sort is exhibited, somebody is sure to stand up and say—"So-and-so has one just the same which works excellently." So was it at Paris; so is it in Berlin, the gentleman who there claims to be the inventor or possessor of an original machine of this kind being named Schippang. Another machine has been seen in Brunswick, but it was very dear.

Herr Prümm explained the construction of a "satinising" machine which he was then using. It consisted of two polished steel cylinders, of which one was hollow and heated inside by a gas jet.

This closed the business of the meeting, which was then adjourned.

Correspondence.

THE UNIVERSAL DOUBLET LENS.—MR. WHITING'S NEW STUDIO.—GLASS POSITIVES.—THE MORGUE.—CARBON FILTERS.—A NEW CHRISTIAN SECT DISCOVERED BY A PHOTOGRAPHER.

IN my last letter I offered a few comments on M. Davanne's ideal of a good view lens. I will now return to that subject—which is, undoubtedly, a very important one—and will offer a suggestion of my own for a comprehensive and, at the same time, convenient and portable form of instrument, with sufficiently-minute instructions to anyone who may feel inclined to have one made and give it a trial.

Let us suppose the diagonal of the picture to be ten inches. The plate may then be either seven inches square or 8 × 6 inches, according to taste. The lens must therefore cover with good definition a "circle of delineation" of ten inches diameter and a "circle of illumination" of fourteen inches diameter. What is meant by these two definitions—"circle of delineation" and "circle of illumination"—has been already clearly explained in a recent number of this Journal by one of our Editors in reply to a correspondent; so I need not repeat that here. The object of having a larger circle of illumination than of delineation is in order that when the lens is raised or lowered, so as to lower or raise the horizontal line of the picture, the corners of it may not be rounded off. When the circle of illumination is too small it becomes necessary to have either a round front, or a swing front, or a swing back to the camera.

This being premised, let us now turn our attention to the lens.

Different subjects will require a different angle of view to be included by the plate, and therefore the lens must admit of having its focal length varied in order to suit the required angle of view. The limits of this variation will require to be very considerable, and for the size of picture now under consideration they ought to lie between five inches equivalent focus and twenty inches equivalent focus. When Mr. R. M. Gordon was with me two summers ago taking views in Brittany he worked upon plates 7½ × 5, having a diagonal of nine inches, and his series of lenses ranged between three and a-half inches focus and seventeen inches focus. Some of his views, therefore, included a very wide angle, and others a very narrow angle, of view; and this he found to be necessary, or he would have lost many charming bits. For my own part I like a seven-inch square plate and the range of focal lengths named above, because many good subjects make a square or circular picture, and by using a square plate the camera has never to be turned upon its side, and its front adjustments made more complex; besides which, if a speck or flaw should occur in preparing a *square* plate, you have *four* different ways of putting it into the dark slide, so that it may not do harm to the picture, whereas with an oblong plate you have only *two* such chances.

The compound lens which I proposed in my last communication I still think to be an excellent solution of our problem. It gives seven different focal lengths, viz., five, six, seven, eight and a-half, ten, fifteen, twenty inches, for a seven-inch square, or 8 × 6 plate—that is to say, for a whole plate 8½ × 6½, with allowance made for ragged edges. There is only one tube, one flange, and four separate deep meniscus glasses. Two of these have a focal length of ten inches, and the other two have focal lengths of fifteen and twenty inches respectively. The ten-inch focus glass may be one inch diameter, and placed three-tenths of an inch from the diaphragm. The fifteen-inch focus glass may be one and a-quarter inch diameter, and placed forty-five hundredths of an inch from the diaphragm; and the twenty-inch focus glass may be one and a-half inch diameter, and placed six-tenths of an inch from the diaphragm. The tube will, therefore, be about one and three-quarter inch diameter externally, and about one and a-half inch long. The compound will then consist of one symmetrical doublet (made with the two ten-inch lenses), three unsymmetrical doublets, and three single view lenses. The diaphragm will be a revolving one, with three or four apertures; and the lenses not in use will be kept in a case in the photographer's pocket. A bellows camera pulling out to two feet and pushing in to four inches, with a common flat front and slider, will answer the purpose if square plates are used. The included angles of view will lie between about 80° and 20° upon the base line. The stops may be four-tenths, three-tenths, two-tenths, and one-tenth of an inch respectively. The single lenses may be made to give either barrel-shaped or pincushion distortion at pleasure; and the unsymmetrical doublets can be turned either with the larger or smaller lens to the view. The thickness of the lenses will, of course, affect their distances from the diaphragm, and these I have only given approximately, and they must be determined by experiment. The single lenses will cover so narrow a field that the distortion which they produce will be scarcely appreciable; whilst their roundness of field can be increased, when required, by placing them with the stop behind instead of in front, which will also increase the brilliancy of the image.

Another plan would be to have two ten-inch, and two fifteen-inch focus lenses. The pair of ten-inch would give a symmetrical doublet of about five inches focus; the pair of fifteen-inch would give a symmetrical doublet of about seven and a-half inches focus; and a ten and a fifteen-inch lens together would give an *unsymmetrical* doublet of six inches focus. The series of focal lengths would then be five, six, seven and a-half, ten, and fifteen inches; and if there were two tubes instead of one, pairs of lenses of equal focus might be mounted in them for taking stereoscopic pictures in a suitable camera. This, however, would not offer many attractions, and the former place will, I think, be the better of the two, and the most generally liked.

A word or two now about the portrait studio. In a letter which I received a few weeks ago from Mr. Matthew Whiting he described a new studio which he has lately built according to a plan suggested to him by Mr. R. M. Gordon, and which seems to answer extremely well, giving more roundness to the image and less light on the crown of the head of the sitter. It consists of a side window, which is continued as a skylight up to the ridge of the roof, the panes of glass being rounded at the eaves. There is a curtain under the skylight which may be drawn or not; and a stream of water can be kept running down the glass in order to keep it always clear and clean. I subjoin a photograph of the building for our Editors to see, and have engraved if thought desirable. The side of the sitter which is not directly illuminated by the light passing through the window is lighted by means of a reflector. The question is—Would it not be preferable to have no skylight at all, and to carry up the side wall, with its side window, a couple of feet higher, which would make the latter about eight feet six inches high? Mr. Whiting has attended to the ventilation of his studio by means of a large square hole in the gable. In his description of it he says:—

"The studio is 20 × 11 feet, and eleven feet high, coming down on the sides to six feet six inches. I have put a lead pipe all along the top ridge, perforated with holes, so that I can let water trickle down the tiles in hot weather. The glass from the roof to the side is continued by a piece of bent glass three feet long and nineteen inches wide."

It is said that all English visitors to Paris go as a matter of course to the Morgue the day after their arrival in the gay capital, to see the dead bodies exposed which may have been picked up in the Seine. The bodies are laid upon slabs, which are so inclined that they can be easily seen by the public, who are allowed to view them through thick plates of glass. The clothes of the deceased are hung up over their heads, and the bodies are exposed naked—a grim and awful sight! The last time I went to the Morgue three bodies were thus exposed, and it occurred to me that they ought to have been photographed, for the chance of their being recognised after decomposition had too far advanced rendered that impossible otherwise. A week or two ago the body of a young girl of most singular beauty was exhibited in the Morgue, and the sight attracted crowds of visitors. It is said that an unfortunate lunatic was so impressed with the sight of her that he at once drowned himself in the Seine in order that his body might be laid by the side of hers upon the adjoining vacant slab! Such things are quite possible in France, and one may believe the story.

The above reminds me of a melancholy event which has just come under my own knowledge, and which has a moral from a photographic point of view. Yesterday morning, whilst dressing at the quiet little country parsonage where I am now staying, the bell of the parish church began to toll its dirge for a departed soul. On inquiring who had died during the previous night I was told it was one of the peasant girls of the village, who had been to school the day before in perfect health, and whose exercise upon a slate I had actually looked over at the school as an accidental visitor. What would her poor widowed mother not *now* give for only a sixpenny glass positive of her little daughter taken during life!

Why are we all so infatuated with *paper* prints at so much a *dozen*, and why have glass positives so completely gone out of vogue? Would it not pay a travelling photographer to go out amongst the poor of the rural districts, taking the old-fashioned sixpenny positive? And why need that necessarily be more hideous than a paper print? It costs no more to do it well than badly, and why should it *not* be done well? And why should not doing it well pay well, even amongst the poor? For my own part, I long to see photography an equal boon to all classes. But that it never can be so long as people are bigoted to one particular process—and that the worst of all!

Water is getting scarce! What do photographic printers and dry-plate men think of this? We must all get filters and make dirty water do. I have bought a two-gallon silicated carbon one for photographic use; and I have now before me a prospectus of a new self-cleansing charcoal cistern filter, by Lipscombe (near Temple Bar). One of these, which will purify 250 gallons per day, costs £6.

A few weeks ago my son, who was then with the rest of my family on a yachting trip in lower Brittany, scrambled up a hillside to find a view for his camera. On descending to the towing-path he came upon a part of the river which, being very deep and with a steep bank, was protected by a dwarf wall. By the side of this wall a man and his wife were walking, the former evidently drunk. It was an extremely wild and solitary spot, and no other human beings in sight, or any human dwelling within a mile or two. All of a sudden the man fell over the wall into the river, and his wife set up a scream of terror. My son ran quickly to the spot, and saw the man sinking, with only his hands above the water. Being a good swimmer he jumped in at once, and dragged him to the side, where he and the woman together contrived with much difficulty to get him out.

The story, in course of time, reached the ears of M. Nadault de Buffon, President of the *Société des Hospitaliers-Sauveteurs Bretons*—that is to say, a club every member of which has performed some heroic action in saving life—and he wrote to my son very kindly, inviting him to become a member, and offering him the silver medal and diploma of the club. His letter contains the rules of the club and the objects for which it has been established; and I will venture to offer a few remarks on this subject, thinking them likely to interest my readers.

The club may be regarded as a Christian sect, composed of members, both male and female, whose avowed object is to carry out *practically* the moral precepts of the Great Founder of their religion as laid down by Him in the latter part of the twenty-fifth chapter of St. Matthew's Gospel. The special motto of the club is—"*Caritate et sanguine terra marique per undas et ignes.*"

My son has responded gladly to the invitation of these worthy Bretons to join their club. May the numbers of this good brotherhood increase until they cover the earth! THOMAS SUTTON, B.A.

July 22, 1874.

DEFECTS IN MOIST PLATES.

To the EDITORS.

GENTLEMEN,—I have been trying to preserve plates prepared by Mr. Sutton's moist process, by placing them in a wooden box made waterproof with shellac; but, after having tried a plate after a week's keeping, I find that the film is covered with spore-like dark spots, varying in size from a small pin's head to an indefinite blotch. These marks are, by transmitted light, dark brown, and in the sky orange-coloured. By reflected light they are better described as dingy white.

A plate is merely washed in four changes of water, in the same way that answers well for plates prepared by this method, and used within a day or two. It is then placed in the box, film downwards, with two narrow strips of india-rubber at each end, to prevent the film from touching the bottom of the box. Other plates are piled in like manner. The box is then filled up with water. The plates are to be organified shortly before using.

Now, my question is—What is the nature and cause of these spots? You have doubtless seen them in dry plates that have not kept well. I am inclined to think that organic germs take up their abode in the film, free bromide being, *perhaps*, favourable to their presence. It is somewhat curious that the spots should be, as explained above, of a different colour when examined by transmitted and reflected light.

Do you think that there is any method of preventing the occurrence of these spots? Perhaps a few drops of carbolic acid would answer, and not affect the plate.

I especially wish to preserve some plates wet during a fortnight's tour in North Wales, so that could you make any suggestion I should be glad and also much obliged.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester, July 28, 1874.

[On one occasion, when a correspondent was annoyed by certain specks appearing all over his dry plates, and which had defied the resources of all his suggestive friends, we examined a plate by means of the microscope and polarised light, and immediately discovered the cause. We suggest a similar mode of investigation in this case. Whether or not the spots arise from the proximity of the india-rubber would be an interesting matter for investigation.—EDS.]

"SOME OF THE CAUSES OF HARDNESS."

To the EDITORS.

GENTLEMEN,—In writing for others it is a good maxim to make yourself as intelligible as possible, in order to aid the understanding of those who read. So far as lies in my power I try to do the former, because I cannot provide capacity for the latter.

What I asked Mr. Dunmore to mark was that I did not assume a bath to be worked from youth to age without remedies; but, instead of doing so, he came to the opinion that I wrote on what I thought to be "*the* causes of hardness." Well, in the face of what I have said, he is welcome to his opinion. "It pleases him, and don't hurt me." As the cock said to his brother, when one of his wings was made shorter from the joint—"Well, never mind; it's only a difference of a pinion."

The extraordinary idea that a bath is not a bath until it is a good one is worthy of *Punch;* and if it exist in Mr. Dunmore's case it does not with me, nor have I said so.

As to the bromide, I do not mention it, for the same reason that I would not mention the chlorising of a printing-bath previous to sensitising paper.

In giving my last words on this subject I would suggest the desirability of having a new work on logic, to show the wisdom of drawing general from particular conclusions in every case.—I am, yours, &c.,

Blackpool, July 24, 1874. W. E. BATHO.

PERMANENT PRINTING.

To the Editors.

Gentlemen,—Being an old photographer I have the desire to see the process of permanent printing brought to greater perfection than at present, and to be available for amateurs. If one cannot go through the whole process it has no special attractions, especially when it is found that the cost for producing, say, a dozen copies is far more than the same number produced by silver printing.

I sent some time ago to two houses, who make permanent printing a speciality, for their list of prices, and found that if I ordered a thousand copies the cost of prints would be less, but for a limited number of, say, fifty the cost of the prints would be more. Well, what amateur would require a thousand copies? And what is there to prevent the amateur carrying out the process entirely in his own little snuggery, where he "blows a cloud" after business hours, and gratifies his art taste by printing all kinds of nicknacks in the shape of street and other views, portraits of his dog "Fido," his wonderful cat, or the last little stranger added to his household?

What we require are some simple and reliable formulæ and plan of producing the collotype or plate with a printing surface—not half-a-dozen methods of various operators, to confuse the mind, such as are generally to be found in instruction books, but one simple method; and, depend upon it, many would go at it with a determination to succeed.

Will some of our clever and favoured photographers give us the benefit of their experience, and tell us how to do it?—I am, yours, &c.,

July 27, 1874. "Come and Help Us."

EXCHANGE COLUMN.

Exchange for repeating-back camera for two *cartes* on half plate, a 20 × 16 glass bath, never used, cost £3.—Photo, Church-street, Wimborne.

I will exchange a Weston's rotary burnisher, *carte* size, for a Meagher folding camera for plates $8\frac{1}{2} \times 6\frac{1}{2}$.—Address, James Mitchell, photographer, Roomfield-lane, Todmorden.

For exchange, a 7 × 9 Kinnear camera, for a $6\frac{1}{2} \times 8\frac{1}{2}$ or a 5 × 8 binocular camera; also an opaque or direct pair of magic lanterns, for oxyhydrogen light, will be exchanged for a 12 × 15 swing-back Kinnear camera and view lens.—Address, A. G. Grant, 7, Gilford-road, Sandymount, Dublin.

Two 24 × 19 dipping baths made of wood in a first-rate manner, shellaced inside and out, with water-tight tops; a pair of Edwards's C.-D.-V. combination printing-frames; and a lot of enamels, quite new, in exchange for rolling and cameo presses, repeating card camera, or offers.—Address, L. P., 13, Parker-street, Storey's-gate, Westminster, London.

ANSWERS TO CORRESPONDENTS.

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

Registrations.—In our next.

A. L. E. X.—Received. In our next.

F. J. Danban.—See Mr. Sawyer's article in our Almanac for 1873.

Alex. Henderson (Montreal).—We shall be much pleased at being enabled to make your personal acquaintance.

G. H.—The silence is easily accounted for; the person to whom your letter has been addressed has been dead four years.

Vernis.—The silk must first of all receive a coating of salted size, after which it may be sensitised, and proceeded with as if the fabric were paper.

Cromatique (Leeds).—Do not use *Condy's fluid* for such a delicate experiment, but use instead some pure crystals of permanganate of potash dissolved in distilled water. This is a powerful oxidising agent.

An Attached Subscriber.—Will you oblige by sending us a very brief article of the rehabilitated order to which you refer—just by way of *sample*, you know? Notwithstanding all that has been said, there are *some* good things in Halleur's work.

Charles A. Owen.—Arrange with the seller to have a trial of the lenses, and then select that which you think, on the whole, best adapted for your purpose. You must not, however, expect that lenses advertised to cover 10 × 8 will give satisfactory results if used for larger plates.

"Paraffine."—Your first query will be answered through post. In respect to the second, the working expenses of photographic establishments differ so much that no average can easily be struck. The best way will be for you to keep your books very accurately for, say, one month, and from this deduce the expenses for a year. If you adopted a proper system of book-keeping you would have no difficulty with the Commissioners.

Douglas Fraser.—Your want of success in dry-plate operations is due solely to your inexperience. Your syllogism is capable of improvement. Instead of saying, as you do—"I have tried dry plates; I have not succeeded; therefore, dry plates are no-go"—we suggest the following modification of the syllogism for your consideration—Other men succeed with dry plates; I have not succeeded; therefore, I ——— . But we leave you to supply the conclusion yourself.

A Lancashire Lass.—We advise you to refuse the commission, which, we think, is merely a trap laid for you. The engraving is undoubtedly copyright, and although you would be morally innocent had you executed the order, you might, notwithstanding, have been involved in much trouble and expense. Had we known your full address we should have written privately to you on the subject, for we have heard that an effort is being made by some unprincipled persons to catch unwary photographers.

F. T. L.—For a dark subject such as the view you enclose the collodion will certainly be the better for the addition of bromide as suggested. The rapidity with which the image flashed out does not necessarily prove over-exposure, but may be the result of using the developer in too strong a condition. The picture bears all the appearance of being under-exposed. Remember the golden rule for photographers—"expose for the deepest shadows." We would also add—reduce the strength of your developer very much.

A. J. Simpson (Casino).—First of all, endeavour to get your primary or direct light from the sky. Do not filter it through a blind or screen. Flatness being the result of a large mass of diffused light falling upon the face, endeavour to work with as small an aperture in your roof as possible. To soften the shadows on the dark side of the face, try the effect of substituting for the open window on the dark side a large reflector, which may be constructed by papering a canvas screen with a light blue or grey paper. The cost of such views as you refer to will be from one shilling to half-a-crown. They are much cheaper on the continent.

Rustic.—1. This correspondent, referring to Mr. Gulliver's camera described in our Almanac for 1873, asks if that gentleman will be good enough to tell him how he manages to expose the plate without the light reaching it while lifting up the top cover. Everything else, he says, seems simple enough.—2. Hyposulphite of soda will keep in solution for an indefinite period.—3. Any good matt varnish will answer for backing transparencies.—4. Our correspondent further says:—"I should like to call the attention of professional photographers to the great desirability of selling their photographs of views, both large and small, unmounted, as almost everybody now has a scrap-album for views. I have been much troubled to 'dismount' some I have bought; a friend of mine the other day bought some large ones of a cathedral, and found it quite impossible to get them off the cards without spoiling them. Some, I admit, come off readily enough, but in any case there is the trouble."

H. C. Jennings.—Our correspondent writes *apropos* of the observations which hade appeared relative to the covering powers of Mr. Dallmeyer's wide-angle rectilinear lenses. He says:—"The one I mostly use is the 12 × 10 of seven inches equivalent focus, and I find that it covers a circle of nearly seventeen inches, out of which a 12 × 10 can be cut, well defined to the edge. I have a 15 × 12 picture taken by it with the smallest stop, but of course the corners are black. As to the performance of each of the single lenses of which it is composed, the front lens is sixteen inches focus, and with the largest stop covers a 12 × 10 plate admirably, giving scarcely any perceptible distortion of the marginal lines. With a medium stop it covers a 15 × 12 sharp to the corners; beyond this I have not pushed it. The back lens is about twelve inches, and covers a 10 × 8 well with largest stop, but with either of the last three diaphragms it covers 12 × 10 *well;* but I always take the precaution to screw it into the place of the front lens, so that the stops are at the farthest possible distance from the lens, and I either use it *in situ* thus, or screw the mount into the flange from *inside* the camera, as I thereby get the diaphragm in *front* of the lens. I also find this lens gives but very little distortion, so that I seldom require any other lens for outdoor work than the rectilinear, as with it I can do almost any class of work except that requiring extremely short exposures. I have also a three and a-half inch wide-angle rectilinear, but it differs slightly from the 12 × 10, as it is symmetrical, and the diaphragm plate placed midway; it is a very useful lens, and either of the lenses can be used for 12 × 10 landscapes of the panoramic character, though they are only seven inches focus."

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

☞ Royal Patronage.—The two eldest sons of His Royal Highness the Prince of Wales—Prince Edward and Prince George—honoured Mr. Melhuish with sittings for their portraits on Monday last, at his studio, York-place, Portman-square.

South London Photographic Society.—A number of the members of this Society met, by invitation, on Saturday last, the 25th instant, at the hospitable residence of the President, the Rev. F. F. Statham, F.G.S. As usual on such occasions a very social and agreeable evening was enjoyed.

METEOROLOGICAL REPORT,

For the Week ending July 29, 1874.

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

These Observations are Taken at 8.30 A.M.

July.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
23	29·92	WNW	59	63	77	55	Cloudy
24	29·88	NW	58	62	73	50	Cloudy
25	30·01	W	56	59	77	50	Dull
27	29·85	W	58	62	69	52	Dull
28	29·75	S	58	59	67	53	Cloudy
29	29·79	W	56	59	—	49	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 744. Vol. XXI.—AUGUST 7, 1874.

TRANSFERRING VARNISHED NEGATIVE FILMS.

The latest "new" thing now occupying the attention of certain among the photographic fraternity in France is the knowledge that a collodion film may be removed from glass after it has been varnished; or, to commence at the beginning, that the varnish may be easily removed from the collodion without danger to the latter.

Every tyro knows that the majority of lac varnishes used for protecting negatives will, after being dried, again become dissolved by alcohol; but within the past few weeks it seems to have become recognised—at least, on the continent—that caustic potash may be employed with much effect as a solvent of old varnish, acting upon it with great rapidity, and not in the least degree placing the negative itself in jeopardy.

This method has for some time been well known, and exclusively adopted, in certain London establishments, in which the exceptional nature of the business necessitates the use of a negative of a pellicular character, of which either side may be placed in contact with the surface which is being printed upon, so as to produce at pleasure a reversed or non-reversed impression.

It may here be inquired by the general as distinguished from the esoteric photographer—Under what circumstances may a pellicular negative, a mere film, be made of any use as compared with one attached to glass? We reply, first, that such pellicles give an immense power of storage and freedom from breakage. If a photographer who has occasion to travel in distant regions has once mastered, *with absolute certainty*, the removal of his collodion negative films from the glass on which they were taken, he is, in a sense, rendered independent. *This* is what he can do:—Having a camera with three double dark slides he can start on a tour with a bottle of sensitised collodion and six glass plates. These six plates he can coat before retiring to rest at night; next day he can expose, develope, and finish them, finally removing the films containing the negatives from the plates, and transferring those worthy of preservation to a folio, leaving the glasses free to be employed for next day's work. How the plates are to be prepared so as to be utilised in this manner we do not stop here to explain, but refer the reader to an article entitled *The Latest Advance in Dry-Plate Photography*, in our number for July 17th last, where will be found all of which our readers really require to be informed.

But, having obtained a negative of the description mentioned, by what means is it to be removed from the glass and transferred to the leaves of an album or folio? Nothing is easier. When the negative is dry give it a coating of a solution of india-rubber in benzole—a good way of making this being to dilute the india-rubber paste of the shops with benzole. This dries rapidly, after which place it upon a levelling-stand, and apply a coating of transfer collodion made as follows:—

Alcohol (methylated)	2 pints.
Ether	1 pint.
Gun-cotton	1 ounce.
Castor oil	1 ,,

When this has become quite dry the margin is cut through with a sharp knife, and the negative placed in a vessel of water, the result being that ere long the film will have become quite detached, when it is to be placed between sheets of blotting-paper before being arranged in the leaves of the folio in which it is to be subsequently deposited. It will from this be seen that the serious *impedimenta* of a clever photographer may now be very greatly diminished in bulk; but this applies, of course, only to a person who *is* clever. A mere beginner, or one who, however experienced, has been adhering to the "good old rule, the simple plan" of twenty, or even ten, years ago will have to serve an apprenticeship of several days to the new system ere he can calculate upon absolute and undeviating success.

Pellicular negatives thus obtained can not only be stowed away in a minimum of space, but may be transmitted through post without fear of breakage. When carefully wrapped round a wooden roller they can be forwarded from one part of the world to another.

But facility in storing or in transmitting pellicular negatives is only one useful purpose served by this class of photographs. The most important benefit is found in the power which can be exercised by the operator of employing the negative either for silver printing or for single carbon, collotypic, or Woodbury-process printing, the last three of which necessitate the employment of a non-inverted negative in order to get a non-inverted image. For producing a print upon a curved or uneven surface a negative of this highly-flexible character is also invaluable.

To remove unvarnished negatives is extremely easy; but when they have for days or years been protected with a layer of negative varnish then a modification becomes necessary. We have spoken of alcohol as a solvent for varnish; this involves, however, a slow and somewhat tedious operation. The best way of transferring a negative which has been previously varnished is to pour over its surface a little of the following solution:—

Alcohol	1 part.
Caustic potash	1 ,,
Water	10 parts.

This must be poured on and off until the varnish is dissolved off; then wash with water, dry, and proceed as if it had not been varnished.

This is practically the so-called *new* method now being adopted in France. When we saw the name of M. Roussillon associated with this method, we were reminded of certain claims which have been recently put forth on his behalf by his friends in connection with the Mr. Woodbury's process of photo-engraving; and to prevent M. Roussillon from being a second time placed in a false position by the injudicious claims of friends who are imperfectly acquainted with details of photographic matters, we inform the latter that the invention at present being heralded by them as the latest new thing was very fully described, and working directions given, in a chapter of our Almanac for 1873 specially devoted to this subject, entitled *On the Transferring of Varnished and Unvarnished Negative Films.* Hence re-invention of the process there described, as is imagined for the first time, comes now somewhat late.

IMPRESSIBILITY TO ACTINIC INFLUENCE.

About the year 1851 Mr. Archer's collodion process first saw the light, and at that time iodide of silver was looked upon as having a specific sensitiveness to actinic influence peculiar to itself. It is true that at that time many experiments had been tried with chloride of silver and a few other chemicals, but with no very striking result; and the *rationale* of many of these reactions was in those days a sealed book. Even many of the first paper prints were iodide prints. The origin of this fashion—or faith, shall we call it?—was Daguerre's process, which, it must be borne in mind, was the first great practical realisation of sun pictures after nearly half-a-century's experimenting by some of the ablest philosophers of the age. It was not until Daguerre's process became known that we had a professional photographer, and this process, as originally devised, was worked with a pure iodide of silver film. Thus we see that from the days of Daguerre's sensitive film of iodide of silver our ideas have been, to a certain extent, wedded to that substance, and that the gradual appreciation of the bromised surface has almost been an insensible induction which only the oldest workers in photography can thoroughly conceive.

Some short time ago we turned up, among a batch of old papers, an early photographic note-book, dated a few years after Mr. Archer's introduction of the collodion process, and which contained a large amount of the best formulæ of the period. How curious to look back at these reflections of the photographic world of 1853 with our present light! We find that it was iodide of silver which had up to this period been used in the first collodions. About this time the bromides of cadmium and potassium came into fashion, but without any well-marked expressions of belief in their efficiency. (The collodion of those days used also to be made entirely of ether ·750 sp. g., and thirty to forty minims of an alcoholic iodiser added to the ounce.)

We even find that to the present day almost all the physico-chemical researches have been tending to the same direction. We have innumerable experiments showing the actinic influence upon chloride, bromide, and iodide of silver, and we know that each of these substances are more or less sensitive to waves of different lengths, or that each chemical has its particular selective power as regards certain portions of the spectrum. Thus, when we deal with the spectrum and allow it to fall upon a piece of paper sensitised with chloride of silver, the maximum chemical effect occurs in the blue part of the spectrum, near the line G, and about one-third of the distance between it and the line H; that when we are dealing with the original Talbotype process (iodide of silver) the maximum blackening effect is formed in the extreme limit of the violet rays; and that when bromide is used we get the maximum more extended and uniform, and dipping deeply into the red or least refrangible end. When Claudet proposed that chloride of iodine, and Gaudin bromide of iodine, should be used in the daguerreotype, and said that they acted as accelerators, they, without knowing exactly why, did precisely what we do now in our collodion films—that is to say, used mixed films which should respond as much as possible to the actinic influence of the whole of the spectrum. Daguerreotype plates were simply iodide of silver. Claudet's plates reduced the time of exposure; but Gaudin reduced the time of exposure to about one-sixtieth.

Now, although, so far, photography has been so very dependent upon the silver salts for these reactions, there is hardly a chemical atom of any complexity which is not susceptible, and will not respond, to the actinic force in some degree. Let us revert to two facts to show how the extension of our experiments lead us away from these old silver friends, to whom we are so much indebted, but at the same time too much wedded.

About ten years ago a patent was taken out in Vienna for a photo-lithographic process, in which the sensitive film was asphaltum and the developer turpentine. This was going back sixty years; for Niepce, the pioneer of Daguerre, had discarded the use of silver salts for a film of asphaltum, and he also developed by essential oils. These pictures were the first images obtained by the camera, and we believe they are still to be seen in the British Museum. But his process could never become of much use, because he required hours to produce his picture.

It is, however, one of the most unpromising of reactions—one that at first sight would appear almost unworkable—that is going to depose bromide and iodide of silver from its high estate. The slightly oxidising influence that chromate of potassium exerts upon gelatine under the action of the waves of light results in the most important and promising of new processes.

Some recent researches by M. A. Cossa (*Deut. Chem. Ges. Ber.* vii., 358) show how remarkably sensitive chlorophyll—the green substance of leaves—is to light, and particularly the light which is abundant in the ultra-violet rays. This colouring matter, as is well known, seems to be necessary to the existence of vegetable life, and to be the vehicle for the elaboration of the internal juices of the plant. The great change observed in the spring and autumn foliage of most plants is due to different stages of actinic influence. Chlorophyll is very sensitive to light, and in the leaf there is a continual bleaching and renewing of the green chlorophyll granules going on. An alcoholic solution of this green colouring matter, according to M. A. Cossa, is perfectly decolourised after half-an-hour's exposure to the magnesium light. His solution was protected from heat by being surrounded by a stratum of water, so that this action of light is quite independent of heat. It is, therefore, a true photogenic action. Sensitive photographic paper exposed in a similar manner for the same time side by side with chlorophyll solution, and both of them under a stratum of a solution of potassium bichromate, is scarcely acted on, but the chlorophyll solution is still bleached; but when we substitute for the potassium bichromate a solution of sulphate of copper the paper is blackened, but the chlorophyll solution remains perfectly unchanged.

A probable application of such investigations would arise in our ordinary printing process, where good effects might be obtained, under peculiar circumstances, by giving an exposure under a film of chlorophyll, and finishing off after the removal of that substance. It would also be interesting to investigate how far chlorophyll would affect the collodion plate itself in the camera.

We are quite sure that the curious reactions of salicine and similar substances are anything but rare, particularly in the organic substances which, from the complexity of their molecules, must be remarkably impressible to actinic force. We thus see that the change in chlorophyll is simply one of actinic influence, quite independent of heat; but although its actinic impressibility is so great when submitted to the sun's rays or the magnesium light, yet the maximum impressibility is quite independent of that part of the spectrum which acts so rapidly upon the silver salts. Such observations as these point to one very important line of photographic investigation, namely, the discovery of sensitive surfaces which shall be equally impressible to any of the rays of the spectrum. The realisation of such speculations is quite within the range of probability, and should stimulate experimenters to diverge more from the beaten track.

ON THE DEVELOPMENT OF ALBUMEN AND BEER DRY PLATES.

It has long been a favourite theory with many photographers that an instantaneous flash of light is all that is required to produce the invisible image, and that the one thing needful for instantaneous photography in all ordinary cases is the knowledge of *how* to develope that image. Without altogether endorsing that opinion, we repeat what we have before said, that with almost all the varieties of ordinary dry plates the latitude of exposure is regulated by the method of development to an extent much greater than is generally understood.

Considering the beer and albumen process as a fair type of those generally in use we selected it for our experiments, and, judging from past experience, as well as from the published opinions of those most intimately acquainted with it, we took five minutes as the average necessary exposure for a 7 × 5 plate with a stop of $f/_{32}$ in the lens. This, with four drachms of the ordinary acid pyrogallic solution, consisting of pyrogallic acid three grains, glacial acetic acid twenty drops, and water one ounce, to which was added five drops of a twenty-grain solution of silver, gave in a little under ten minutes a first-rate negative, full of detail, and ample in contrast, the image being of a fine yellowish-green, with the highest lights, though sufficiently non-actinic to prevent the passage of active light, as transparent as stained glass. A plate from the same batch was next exposed for thirty minutes. The development was conducted by first immersing the plate in a three-grain solution of plain pyrogallic acid, and leaving it untouched for a quarter of an hour, by which time the whole of the detail was fully but feebly out. To half-an-ounce of the solution one grain of citric acid and ten drops of the silver solution were added, and this rapidly brought up sufficient density, although the negative looked somewhat flat. To remedy this twenty additional drops of the silver solution was added, and caused to flow rapidly over the plate for a few seconds, which had the desired effect, producing a brilliant and effective negative, that showed equally well whether examined by reflected or transmitted light, and gave a print of excellent quality. Lastly: another plate was, under similar circumstances, exposed for only ten seconds, moistened with alcohol, and flooded with the strong alkaline developer recommended by Colonel Stuart Wortley, which in a few seconds brought out the detail as fully as the plain pyro. had done in the previous case, and was easily brought to printing density by the acid pyro. and silver, four drachms of the former and five drops of the latter being all that was required, and the time of action about six minutes.

Although we thus see that, in the case of beer and albumen plates at least—and, we have reason to believe, in that of most other plates—there is very considerable latitude allowable in exposure, we do not by any means advise short exposures as a rule; our advice is to err rather on the side of length—to give a very full exposure. The development should be conducted by first washing the plate, but not to such an extent as to remove the whole of the beer; then immersing it in a solution of plain pyrogallic acid, and leaving it undisturbed for ten or fifteen minutes. If at the end of that time an image pretty full of detail is produced then strengthen with acid pyro. and silver, as already indicated. If, however, from under-exposure, no image has appeared, then to half-an-ounce of pyro. solution add five drops of a drachm-to-the-ounce solution of liquor ammonia, and pour it rapidly over the plate. No bromide is required in this case, the trace of beer remaining in the film acting as a restrainer, and preventing any tendency to fog. This will usually bring out the detail perfectly, but if necessary a few additional drops of the ammonia may be added with safety, and the image afterwards intensified with pyro. and silver.

It may be well to say, in conclusion, that, notwithstanding what is so frequently said to the contrary, any ordinary collodion well suited for wet work will not do for the kind of treatment here recommended. An iodised film is not susceptible of development with ammonia; and, therefore, in the case of the bromo-iodised film the image is, in the first instance at least, produced by the reduction of the bromide of silver. The collodion, therefore, should not contain less than three grains of bromide of cadmium in each ounce. The sample with which our experiments were made answers admirably, and consists of equal parts of ether and alcohol, with five grains of a powdery pyroxyline and three grains each of bromide of cadmium and iodide of ammonium in each ounce.

With reference to Canon Beechey's letter in another page, and bearing in mind that many readers may not comprehend the precise meaning of the terms made use of or implied when treating of the curing of halation by means of coloured paper simply placed behind a plate and the same paper placed in optical contact with the glass, we suggest the following experiment, by which any person may at once see the great absorptive power of the latter as compared with the former:—Place a lighted candle or lamp at the distance of a few (say ten or twelve) feet, and having obtained a tolerably large and flat plate of glass hold it just a *little* below the line of vision, so that when looked upon an image of the flame will be seen reflected. But not one image alone will be perceived, but *many* images formed by re-reflection from the lower surface or "back" of the plate; and the nearer the plane of the plate is to the line of vision the more numerous will be the reflections. Now apply in close contact with the lower surface of the glass a sheet of red and dry blotting-paper, and again examine the reflected images. No change will be found to have taken place either in their number or brilliancy; but, without altering the position of either the glass or its paper backing, get a friend to apply a large sponge charged with water to the paper, so as to impregnate it with the water, and then place it in "optical contact" with the glass. Now mark what takes place. Every one of the secondary images reflected from the back surface disappears as if by magic, and no image is seen except that which the upper surface of the glass reflects. This simple experiment illustrates in a striking manner the real value of a backing to a sensitive plate, and shows, further, the value of a coloured paper which is, as compared with one which is not, in optical contact with the plate.

BATH TROUBLES AND EMULSION TROUBLES.

Just now the throwing down a nitrate of silver bath by the aid of copper or zinc seems likely to become the fashionable mode of procedure. The nitrate bath I have in constant use is at least six years old as far as I can answer for its age, but probably it is much older, as it was purchased from the belongings of an amateur who found the art less delightful and more uncertain than he supposed it would have been, and has now renounced all connection with at least the wet process, declaring, in doing so, that he had been very successful with dry plates. This gentleman presented me with a dry-plate negative, doubtless with the intention of my setting it up as a beacon to warn me of the miseries and uncertainties of the wet process, while extolling, at the same time, the virtues of the Liverpool Dry Plate Company's plates in most unmeasured terms. I am quite sure this negative alone was enough to destroy every good opinion previously expressed respecting them; and, had I not been fortified with better evidence of the merits of these plates, I should have prophesied for the aforesaid company a brief and "limited" existence. I was, however, in a position to deny the particular virtues ascribed to the Liverpool dry plates, for I was then patching up a process of my own by which that aërial effect I was accustomed to obtain with the company's plates should be secured. I did not advise my amateur friend to learn how to develope dry plates—for persons occupying a good social position in life must be listened to on every subject—but walked away with the bath I had purchased.

After filtering and testing the strength of the bath I exposed a plate to test its working powers. The result of this experiment made manifest the sick condition of my newly-acquired bath, and the remedy for its ailments which I tried was to make it alkaline with a few drops of ammonia and boiling it; afterwards I placed it in the light to cool, then filtered, and made it slightly acid. All went well for a few months. But, after a few days of hard work, symptoms of indisposition again appeared, and I came to the conclusion that a very thorough purging of its impurities was necessary. I consequently precipitated it with carbonate of soda, thoroughly washed the precipitate with several changes of water, and redissolved it with nitric acid. I had now a new bath, as many will suppose, and which is true enough; but, as I had not by this means got rid of the cadmium and other salts, it was not in the most desirable condition to begin with. Although the argentometer registered thirty-five grains to the ounce, I was working with less than a thirty-grain nitrate of silver solution. The organic matter was, doubtless, thoroughly eliminated, and the bath was so much the better for that; but to say that it was a "new bath," in the sense in which we apply that expression, was far removed from the truth. Up to a certain point carbonate of soda precipitates the silver, and then commences to redissolve it, just as would be the case in doing the same thing with salt, chloride of silver being soluble in a strong aqueous solution of chloride of sodium. Liquor ammonia also precipitates silver; but the least excess beyond the turning-point and the solution is bright and free from any precipitate, which suddenly becomes redissolved. Take it for all in all, precipitating with carbonate of soda is a nonsensical proceeding, requiring too much of "feeling the way," and is far from being perfect when done.

My next mishap with the bath gave me the chance of testing the virtues of zinc, which Mr. Chisholm, of America, has extolled as almost beyond the possibility of going wrong. I had a splendid chance of testing the evidence in its favour. One day, early in the spring, when the weather was extremely fine, I decided upon a trip with my Howard tent. After fitting the tent up, and examining the brilliant image on the ground glass, I was sorely disappointed to find that my bath (gutta-percha) had been leaking. Twisting, turning, and examining it had only aggravated the evil, for the silver oozed out in a most unmistakable manner. So I hastily packed up, left my "traps" at a cottage, and wended my way towards the village in search of a quart bottle, dropping tears of nitrate of silver as I proceeded on my errand. "Chemist by Examination" attracted my attention, and I quickly sought the man who had passed this trying ordeal, but found only the wife of the "medicine man" in charge of the establishment. To her, however, I quickly made known my distress, when she handed me a quart bottle, of doubtful cleanliness, and a tin funnel, unmistakably filthy, whose especial function, it appeared, was to assist in the discharge of barrels of oil. At my urgent request the latter was exchanged for a glass funnel; but as this also had had a special duty assigned to it, namely, the filtering, &c., of syrups, its cleanliness was not quite apparent. However, with Mr. Chisholm's injunctions respecting sick baths before my mind's eye, I used this latter funnel to transfer the nitrate of silver from the bath to the bottle. Nitrate of silver is evidently a fine solvent of syrups, for the crust and sticky substance on the sides slided beautifully into the bottle. I requested the lady to rinse it before applying it to its accustomed work; but, as an extra precaution, she first wiped the dripping neck with her white apron. My mind now reverted to the "chemist by examination," and I mentally heard his anathemas on photographers in general.

On arriving at home, feeling sure the bath was disabled for work, I coated a plate, and exposed through the window at a well-lighted clump of trees. On development the picture came up with beautiful half-tone and vigour, presenting that rich, madder-brown bloom which can only be got from the very best of dry plates. This was quite contrary to my expectations, so I decided upon trying the capabilities of the bath the next day. This time every disease that bath was ever heir to presented itself in the most virulent form; it was beyond the hope of recovery by any of the "persuasive" means known to photographers. The only remedy was to reduce it to metallic silver —the bottom round in the experimental ladder.

I decided upon zinc in preference to copper or a Daniel's battery, for the simple reasons—first, that I had not got a battery; and, secondly, because most dabblers prefer copper to zinc. It was a good "reason why" I should prefer to differ with experimentalists generally; for it is a weakness with emulsion workers to differ, rather than agree, with anybody. Pure zinc could not readily be obtained, so I took the only available article at hand—clippings from the plumber's shop. A very energetic action was at once set up as soon as the strips of zinc were placed in the silver solution. The precipitated silver—if silver it were—I thought looked most unpromising, being of a dirty grey colour. After a few hours the action had altogether ceased, and I tested for silver in the supernatant liquid with a drop or two of a solution of bromide of potassium. All had not been precipitated, and yet the action was likely not to proceed further. I again tested to ascertain its acid or alkaline condition. It was necessary to add acid to continue the action of the zinc upon the weak silver solution. All went on well for an hour or so, when it again came to a standstill. The solution had become alkaline; I added more acid, and the action proceeded. This time my bromide solution indicated that all the silver in solution was completely thrown down. The zinc scraps were well brushed and taken out of the solution. A little sulphuric acid was added to dissolve the fragments of zinc likely to remain in the solution, or rather in the precipitate; and as I also expected to dissolve the oxide of zinc present, I continued to add the sulphuric acid, washing the precipitate in a dozen changes of water, yet my labour and chemical knowledge but little affected the dusky appearance of the should-be "pure silver."

Before consigning the mass to the residue tub it was worth while, I thought, to carry forward my unpromising proceedings to the end; so put the pasty remains in the oven for a day or two. I grieved for the loss of time entailed in bringing a bath to so much dirt. A few drachms of nitric acid dissolved it, but it refused to crystallise into pure nitrate of silver; so I added water to half the amount I had when it was a *bath*, filtered (which looked like the greatest of photographic jokes), and tried a plate. It seemed to "take kindly" to the plate when taken out of the bath, which made me think silver was present. On development a picture flashed out full of bloom and vigour. I tested with the argentometer and found my new bath registered sixty grains in strength. Here hope revived. I placed the bath in the sun after making it slightly alkaline with ammonia, and in the evening it had a black deposit at the bottom. The next morning I filtered as much into a bath as would enable me to try a plate. Just at that moment a cab, with a grey horse, came along the lane past my house. I had a shot for almost an instantaneous exposure, put on the cap, and found I had forgotten to take the half-inch stop out instead of using the full aperture—the arrangement made in my own mind. On development I found, as Mr. Chisholm had done before me, that I was working with the purest of silver. The picture came out full of detail. A week's exposure to the sun and a good filtering freed the bath from the black oxide of zinc, and I am now working with as good or better materials than before my mishap. Adding water to the same amount as I had before commencing operations I found the bath stood at thirty grains to the ounce, proving that although the material had passed through a variety of ups and downs it answered to the "roll call" of the argentometer.

It would, perhaps, be advising a person wrongly, when the next sick bath troubles him, to stick a sheet of zinc in it, keep it acid, and get a pure silver bath from it; but when it has contracted confirmed bad habits the chastisement is zinc. Follow this advice. It is as good as could be given by a school board, and worthy of becoming a photographic commandment.

Adulteration of silver is rarely discovered, but I certainly believe that it is often impure, and contains nitrates other than silver; and if a bath be made up to say thirty grains in strength it is just possible that twenty-five grains are silver and five grains may be the nitrate of potash. Yet to all appearance everything is as it ought to be. Every plate robs the bath of so much silver, setting free nitric acid to combine with the base of the salts contained in the collodion; so an impurity may be introduced into the bath to begin with, without power to detect it from any visible evil it will work.

This year I have been trying extensive experiments in emulsions, and have landed myself amongst a host of difficulties. Nothing seemed to work well. Old formulæ which used always to give good results have turned out the very essence of flatness, as though the emulsion process had been attacked by an universal epidemic. Old collodion was mixed with new, but the result was failure. I changed methylated for pure ether; still failure. I tried a new sample of pyroxyline; no improvement. Fresh samples of bromides were experimented with; still the atrophy of weakness stared me in the face. Nos. 1, 2, 3, 4, 5, and 6 bottles of collodion were mixed and intermixed, yet everything was unworthy of the collodio-bromide of old by which I have been accustomed to swear. I began to feel alarmed for my photographic bantling, and every engagement was declined in order to administer a new stimulant in the hope of recovery. Even my friends, who could not distinctly discern between a bottle of emulsion and one of pale ale, inquired respecting my "difficulties." The fine weather was taunting me outside, and my difficulties inside, the dark room. Everything had been bought new, except the nitrate of silver, which was giving excellent results when made into an ordinary bath, and seemed above suspicion. Yet I repaired to a photographic friend and obtained a small quantity of pure nitrate of silver. I mixed up an ounce or two more of solution with this sample, cogitating in my mind what was to be the next line of inquiry. Half-a-dozen plates were prepared, and while they were drying I cross-examined myself on every particular point, but seemed to come no nearer to an elucidation of my troubles. However, I had now exposed one of these plates and commenced to develope, when the picture gradually increased in density to the right point, and I was as pleased with the results as a schoolboy would be when presented with a new rocking-horse. I exposed the remainder of the plates, and carried the development far beyond anything that was necessary, with capacity only for printing one copy in two days.

Now, as I have nearly always used the common crystals of nitrate of silver—that at 3s. 6d. per ounce—and considering that my emulsion preparations should be counted by the hundred, the probability seems remote enough to my getting wrong; but as some one trying the emulsion process may happen to be supplied by the makers of the same sample of silver which landed me in these difficulties, it would be well to use the recrystallised silver in trying any modification of the emulsion process. If the common kind answer the purpose equally well there can be no objection to its use. As regards my own failure, I was disinclined to believe that it could arise from the silver, which worked without any marked drawback in a bath in the ordinary way, but which, applied in a different form, produced results that would have put any process to shame.

J. W. Gough.

M. DUCOS DU HAURON'S HELIOCHROMIC PROCESS.*

It will be in our readers' recollection that the description of this process was cut short at M. Ducos du Hauron's operations with dry plates; and in connection with these he begins the last section of his paper with a caution. The plates contain coralline, and should they be laid horizontally in a bath of distilled water before fixing will become covered with minute blisters very difficult to deal with. They should, therefore, be put into a vertical bath, which will obviate the trouble. When coralline is used tannin will not do as a preservative; it completely neutralises the effects of the former, and reduces the sensitiveness of the red plate to the red ray to its normal condition. Diluted albumen is even less available, for with it the plates have no sensitiveness to the red ray at all. Therefore it is to be inferred that every preserver which may do for ordinary white light will not do for heliochromy, and M. Hauron accordingly sticks to resin.

These being the processes, the next point is to adjust the coloured glasses for the camera and the shades they ought to have. It will have been observed that this process is one of light filtration. Certain rays are allowed to reach the sensitive glass and no others, and by this means sections, as it were, of the colours of an object are printed on several plates, which thus become, like prepared stones in chromolithography, ready, when combined, to give a harmonious and accurate picture. And it may be noted, in passing, that M. Hauron's plan of interposing glasses of various colours and shades of colour between the plate and the image, if successful for the end sought, entirely controverts the assertion of Dr. Vogel, which has undoubtedly the aspect of great probability, whatever be said of his pigmented plate theory, that the impure colours contained in such glasses do not give the same results as the purer hues of the spectrum.

But, however this may be, it is necessary here to deal with M. Ducos du Hauron. His object is to obtain three negatives having the three primary colours as their base of gradation; and, in order to obtain these satisfactorily of the same sharpness and size, the coloured glasses by which they are produced should be placed, for one thing, very near the sensitive surface. The interposition of such glass changes the focus slightly, and this M. Hauron has remedied easily by focussing through an uncoloured glass of the same thickness as the coloured. These coloured plates should, of course, be all of the same thickness, otherwise the resulting pictures would be of unequal sharpness. When the plan is adopted of screwing discs of coloured glass into the front of the lens tube the glasses must be perfectly plane and of uniform quality, otherwise the images will be blurred.

Concerning the colours themselves the explanations that follow may be of use to those who care to try the experiment. The shade of red wanted is discovered by coating a plate with plain collodion charged with red coralline. Glaziers will easily be able to supply shades of glass very near to that standard, and their defect may be supplemented by coating them with the collodio-coralline, should more intensity be required. It is easy to recognise experimentally when the red glass has acquired the right intensity by examining the feebleness of the markings which the blue ray makes through it on a sensitive plate; these will be the feebler the stronger the red. But there is a point beyond which the addition of coralline will not produce any additional feebleness of impression, and that is the point at which to stop, for an intense colouration would only result in needlessly prolonged exposure. Wet collodion requires a slightly greater intensity in the red glass than dry.

The shade of green which is suitable is determined by observing whether the imprint of the yellow parts approaches in intensity that of the blue. If the green have too much blue in it the yellow object will not be impressed, and if too yellow the blue will be wanting. In case an experimentalist has only one green glass to work with, and which is obviously too blue, it will be easy to remedy the defect by coating the glass with plain collodion containing curcuma yellow in a proportion which a few trials will easily determine. The curcuma is easy enough to use; but plates so darkened must be kept in the dark when not actually in use, as the yellow pales rapidly on exposure to light. Wet collodion requires a green glass with rather more yellow in it than dry, so that it is well to have two glasses of this kind—the one for the one sort of plate, and the other for the other.

There is no difficulty in getting the violet shade of glass, for in this relation a blue glass gives essentially the same impression on iodide of silver as a violet, as has been proved by experience. In practice M. Hauron uses a deep violet-coloured glass, as it offers, among others, the advantage of lengthening the time of exposure, which would be, in sunlight, otherwise of an inconvenient rapidity, especially as the other two kinds of light filters he uses require to be worked with full, or almost full, apertures.

So much for the tools by which the work is done—rather nondescript we must, perforce, aver, and, *primâ facie*, very doubtful-looking so far as any accurate scientific results or genuine chromatic pictorial effects are concerned. Exactitude does not appear to be sought; for when we proceed to the *modus operandi* there is apparent a confusion of proceeding which is rather puzzling.

For instance: after having sensitised a coralline iodo-bromised plate M. Hauron begins by exposing it to diffused light for a second, thereby, as we should fear, destroying somewhat its particularist power as a register of a special order of tints. This done it is taken back to the dark chamber and, after washing, covered with a five-per-cent. solution of chloride of sodium. In this state it is then exposed behind the coloured red screen in the camera. After twenty minutes' exposure the plate is washed again and developed with nitrate of silver and pyrogallic. M. Ducos has thus, he says, got a strong positive image by transmitted light, in which the red and yellow objects were represented by the white and the blue by the black. This positive was obtained quicker than a negative could have been; and hence it happened that by means of a print we could get a negative print which offered, according to the length of exposure, some advantage over a direct negative. M. Hauron here notices a point which he deems of vast practical importance—it opens in his esteem a vast field for experiment. If, he says, some glasses be prepared successively with different salts of silver—iodide, bromide, chloride, cyanide, sulphocyanide, and soforth—and if these be coated after exposure to diffused light with a solution, more or less concentrated, of divers alkaline salts, and then put in the camera, it is likely that a more rapid formula will be discovered than the one he has given. This is candid, at all events; but M. Hauron *might* have said whether he had tried the plan or not, or whether it was a mere guess, which might send the patient student a-chasing mere moonshine. He offers to these this further general observation—never to lose sight of the fact that the shade or intensity of the coloured medium ought to vary with the varying composition of the sensitive films; but, unfortunately, he gives no hint how the student is to get at this variety for all the salts enumerated except the general one quoted above.

Pass on now to the all-important point—Can these confessedly monochromatic negatives be used to produce heliochromatic effects? We are sorry to say that the question gets no definite answer. The subject is introduced by a flourish regarding all that everybody has done on this head, or any analogous thereto, almost most of which is certainly beside the mark, for neither Mr. Woodbury nor Messrs. Albert, Edwards, or Geymet ever attempted to make photography subservient to colour printing after such fashion as this. Impracticable as we hold the process of M. Leon Vidal still to be it is to our minds the perfection of sureness and simplicity before this strange heap of empirical researches that lead nowhere. Beyond this flourish and a quotation from M. Vidal, expressive of the belief that his process of printing is the complement of M. du Hauron's, we have no hint of what his proceedings are. In all probability, however, he professes to print in the same way as M. Vidal, using a different pigment as base, according to the negative; but, if so, he has not, after all, and supposing it true that he gets a variety of effect on each plate, the infinite blendings of the primary colours as a result, but three hard shades of them mixed in a distorted fashion, which M. Vidal at least avoids. It is not our wish to speak dogmatically upon the point, as we have not yet seen M. Hauron's productions; but there is a strong probability in every way against the process, as expounded by him, having any success or being of any utility whatever. Should it be possible to produce sections of colours on different plates, so that they themselves when combined will form a perfect image, then there would be some hope; but any negative that depends upon printing is as far off from true heliochromy as ever. We further strongly suspect that Dr. Vogel is right, and that M. Ducos du Hauron is altogether on the wrong tack in supposing that anything approaching a pure filtration of colours of certain orders could be obtained through glasses tinted, cooked, and obscured, as those he uses are. His experiments are interesting as a sample of perverted ingenuity and enthusiasm devoted to the realisation of the unattainable, and that is virtually all.

* Concluded from page 352

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

When I find our facile friend Mr. Sutton contributing an article to your Journal of July 3rd in favour of symmetrical lenses, and another, three weeks subsequently, in favour of *non*-symmetrical lenses, I infer that his opinions have in the intermediate period undergone *some* change. For many years Mr. Sutton has stood alone in his advocacy of mechanical symmetry in a landscape or copying lens as a *sine quâ non*, no matter for what purpose or under what circumstances it was to be used; and that he has now renounced these opinions and has suggested a system of unsymmetrical lenses as "a very *perfect* system" for landscape work must be held to be a pleasing proof that he is not so firmly wedded to opinions as to refuse to renounce them when found to be no longer tenable. Here is the law by which the whole question is governed, and I do not quite understand how a mathematician like Mr. Sutton failed to see it:—Unsymmetrical conditions of production necessitate the use of optical means possessing the same ratio of non-symmetry. This law has reference to cartographic delineation only; angular aperture, and the best conditions under which it may be secured, are kept out of sight. In proportion as the anterior conjugate differs from the posterior so must the anterior element of a combination lens differ from the posterior. But to come to the practical part of the matter: the lens now suggested by Mr. Sutton will answer exceedingly well. Several years ago, when the Pantascopic Company had premises in Red Lion-square, I purchased from them a lens of the kind now recommended, and have at intervals used it. There are many of them now in use, and I understand that they are much appreciated.

One sometimes comes across announcements in the advertising pages of photographic journals which are not quite plain to the unsophisticated understanding. A Stafford gentleman, it appears, adopts a certain secret process of what he designates a "new invention of photographic combinations." So far as I am able to grasp his meaning, he defies any person to discover his secret; but what I do *not* understand is this—he announces his intention of revealing his secret to anyone who finds it out within the next six months! His announcement is—"To any photographer stating in what way I obtain the results within six months from this date I will give my system of working free of charge." One's first impression is, that if an independent discovery of a secret process be made, small thanks are due to anyone for re-telling him what he has already discovered. Most assuredly Mr. W. Tilley has made at least one discovery.

With a request made by Mr. Thomas Forrest, of Pontypridd—who denies, however, that he is a Welshman—I willingly comply. In reply to an observation in my last *Notes* respecting the reduction of residues being a "joke" Mr. Forrest requests me to show him how to perpetrate such a joke. I shall endeavour to do so. Now, then, let as many of my readers as care draw close their chairs and hearken to the shortest lecture upon silver residues which they have ever heard, or to which they will probably ever listen:—

If the residues be in solution—say as an old, worthless nitrate bath—immerse a piece of copper, when the silver will be all thrown down as pure metallic silver, ready either for fusing, dissolving, or for selling at so much per ounce. Is the residue locked up in the form of old hyposulphite of soda solution? Then pass a current of sulphuretted hydrogen through it, when it will precipitate in the form of sulphide of silver, which can either be dissolved in hot nitric acid if it be desired to convert it into nitrate of silver, or be reduced into the metallic form by mixing it with equal parts of carbonate of soda, carbonate of potash, and nitrate of potash—seven parts of each of the former and two of the latter. The quantity should be such as to half-fill a crucible, and when it has been placed on a fire and deflagration has taken place more of the mixture may be introduced until it is about two-thirds full, when the heat should be raised so as to ensure the reduction of the metal. If the residues be in the form of old, untoned prints and scraps of printed paper, burn them and treat the ashes as directed for the reduction of sulphide. The chloride of silver, also, may either be reduced in the above way or be converted into metal by placing it in a vessel with water acidulated with sulphuric acid. Immerse a piece of metallic zinc, when the chloride will become converted into metallic silver. It would be an insult to the reader were I to say that chloride of silver may be precipitated from a solution of the nitrate by the addition of common salt.

To prevent any London photographers from being disquieted by your announcement of the "location" among them of the great Russian photographer, Bergamasco, permit me to state that it is not his intention to do so during the present year. He has already left London, and it is probable that he will not return till the early part of next year. I believe, however, he does not contemplate settling in London permanently, but only to reside here during a portion of the summer.

I am the fortunate possessor of three hats—one of black felt, one of grey felt, and one of the orthodox "silk" class. When I am not wearing one of these I am utilising either of the other two. Now, what I assert in connection with these hats is that they do not allow any light to get to my head. I further venture to assert that, as the greater includes the less, the stoppage of the light by my hat ensures the stoppage of that of which light is composed—among other things, of its actinism. On what principle, may I inquire, does Mr. W. H. Warner line his hat with green and orange-yellow paper to prevent the actinic power of the light from reaching his head, and thus producing sunstroke? What between the opacity of the hat itself and its impenetrability to light and the non-actinic colour of the hair of most members of the human family, one would certainly think that there was little use in farther barring the way, against the intrusion of that which could not enter, by the green and orange paper. If people really feel "relieved," as Mr. Warner says, by wearing paper in their hats, it is only another illustration of a doctrine very generally accepted, namely, that mind exercises a considerable control over matter.

The death of Mr. Cosmo Innes, late Professor of History in Edinburgh University, took place last week. Mr. Innes was a photographer of the old school, who at one time took great delight in, and executed some good negatives by, the waxed-paper process. The subjects generally were of an archæological character, as might easily be imagined by those acquainted with the antiquarian proclivities of the deceased gentleman, who has died at what may be considered as bordering upon a ripe old age.

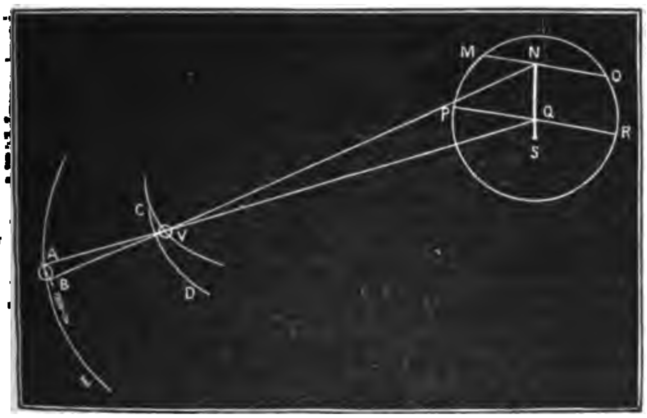
THE TRANSIT OF VENUS.

Photographers have heard so much of late regarding this great astronomical event that many of the profession must wonder what it all means, what it is proposed to do at this time, what we are to gain by it, and why there are such extensive preparations made. Perhaps a few plain statements regarding the objects sought and the importance of the event may not be uninteresting. It will help those whose ordinary interests do not lie in that direction to see what the event is, and how important a part photography plays in it.

To begin with: this transit of Venus takes place at singular and very irregular times. Owing to the way in which her orbit plays round or across ours at an angle it is only at very particular conjunctions that the paths cross each other at a time when Venus is between us and the sun. The plane of Venus's orbit is inclined 3° 23′ to that of the earth, so that little more would make the two revolve in parallel orbits, and hence the peculiarity of the connection of the two; for it results from this, and from the fact that it takes almost as much time for Venus to make thirteen revolutions as the earth to make eight, that Venus only comes between the earth and the sun once in eight years, and once in two hundred and thirty-five years at the ascending node, and the same at the descending. The last transit at a time when Venus was rising up from below the earth's orbit in this way took place, therefore, in December, 1639; and the next after the one in December will be in 1882, after which there cannot be another till the year 2004, when the first of the two at the "descending node" will take place. Hence the extreme importance of watching these events with the new appliances of science which have been invented since the seventeenth century, and getting to know what the transit has to teach.

And what is it that men primarily look for in connection with this great expenditure of money and skill? The chances of operation will all be past within a few hours at the outside, and for the sake of these few hours expeditions have been fitted out by nearly all civilised governments at great expense, which are to take their stations at all points of the globe where observation is possible, and register minutely what they see.

It would be impossible to enumerate all the results that may flow from the minute and complete registration of this transit which, by the aid of photography, is to be looked for; but the first and great object is, no doubt, to determine more exactly the distance of the sun from the earth. Within a million or two of miles that is not yet rendered certain; and it is expected that the measurements which will be possible from the accurate registers of this transit will enable this point to be finally set at rest. In order to make clear how this is done we cannot do better than quote from an essay recently published by Professor Core, of Owen's College, Manchester;* and we may say that there, and in the current number of the *Edinburgh Review*, the reader will find much that is extremely interesting on astronomical subjects placed before him in a manner so little abstruse as to be easy of comprehension to those who do not profess to have carried their mathematics far away from school. Professor Core says, in explanation of the diagram which we here reproduce:—



"Let A E C V be portions of the orbits of the earth and Venus, C the ascending node, C D the projection of the orbit of Venus on the plane of the earth's orbit, and S the centre of the sun's disc, M O R P. A spectator at A in a high north latitude will see Venus as a dark spot traversing the sun's face from P to R, the angular motion of Venus in her orbit being greater than that of the earth in the proportion of thirteen to eight. Another spectator at B in a high south latitude will see the planet traverse a different line, M O, higher upon the sun's disc; and manifestly the distance between these lines—that is, the distance N Q—will depend, first, on the distance A B, and, secondly, on the proportion which A V bears to V Q. The first distance is known whatever be the points A and B, as the earth's form and size are well known; and the second ratio is known by Kepler's law. This ratio is nearly eighteen to seven—that is, nearly two and a-half to one—consequently the distance N Q is about two and a-half times A B. And if A B is the diameter of the earth perpendicular to the line A S, then N Q is nearly 20,000 miles. Suppose, now, that Venus could at the same instant of absolute time leave on the sun's surface a permanent mark of her position as seen from A and B, on looking at these two marks from any other place or at any other time we should always know that they were 20,000 miles apart, and by finding what proportion this bore to the whole diameter we could find this diameter in miles."

Venus does not leave a mark, but her course may be photographed; and, although owing to the earth rotating on its axis the problem is made practically less simple than as there stated, even this difficulty may be utilised by means of photography so as to extend the area of observation. If at the instant of first contact a plane be conceived touching the sun's limb at the point of contact and passing through the earth's centre, then at all stations on the circle in which the plane cuts the earth the transit will commence at the same time. For any station on the left of the plane (with reference to the spectator at the earth's centre looking towards the sun) the transit will commence sooner, and for stations on the right it will commence later. Accurate observations thus taken at favourable places, and taking into account the time taken in passing, as well as the position when compared, will enable the astronomers to determine exactly the true position of the sun—a work that might possibly be done without photography, but certainly not with the same ease nor in so satisfactory a manner; time could be determined, but not place. Thus the last transit of Venus in 1769 (June 3) was well observed, and European governments fitted up expeditions which, although yielding many valuable results, did not suffice to set this question at rest, and it, of course, left no register such as a photograph can give.

From a paper in the *Moniteur* we see that France is to occupy five stations, viz., Campbell Island, St. Paul, Nouemea, Pekin, and Yokohama. That she does so is said to be mainly owing to the zeal of Captain Dumas, who has made the preparations, and ensured that France, in spite of her disasters, shall not be unworthily represented. England is, we believe, only officially to occupy half-a-dozen stations, but there will be several private observatories, and altogether the preparations for the event are on a scale worthy of its importance. The German expedition for the southern hemisphere sailed from Sunderland during the present week.

* *Essays and Addresses by Professors and Lecturers of Owen's College, Manchester.* Macmillan and Co. 1874.

In connection with the same subject we learn that M. Janssen has laid before the French Academy of Sciences a lens constructed by himself and M. Pragmonski, which is of five inches aperture and six and a-half feet focal length. It is made with a view, as far as possible, to correct the aberrations of light which so haunt solar photography; as, for instance, in the case of the coming transit, when the orb of Venus has just passed on to the sun's disc, so that its outer edge should be leaving the rim of the sun, there appears a Siamese twin-like black ligature, as it were, holding it back. M. Janssen has paid great attention to achromatism, but it may be doubted whether he has succeeded in mastering a difficulty like this. He has, however, attempted it in another way, and, after abandoning the idea of exposure by electricity and making many experiments, has adopted a revolving shutter in principle the same as that of the revolving diaphragm. This obviates any shaking of the apparatus such as is incident to sliding shutters, and the revolution of the perforated wheel determines, of course, by its speed and the size of the slits the length of the exposure. If this movement be connected with that of a sensitive plate, so that at each time that a new hole in the disc is to pass in front of the lens a fresh bit of sensitised plate will present itself for the impression, a whole series of negatives may be taken on one and the same plate; and M. Janssen's apparatus is constructed to this end, so that once the clockwork is adjusted and the focus taken a continuous series of observations of the motion of the planet across the face of the sun may be made without hitch or delay.

MEDALLION AND ARCH-TOP PRINTING.*

These are very popular styles for printing from the negative, both on account of their beauty and because by their use the photographic printers are enabled to prevent defects in the negatives from printing. These are advantages which we sometimes have, and for which they are peculiarly adapted. For instance: a negative with a *black* velvet background is broken along the upper part of it in one place, and in another part of the plate it dried before exposing. These defects are in such a part of the negative that a proof printed from it *plain* cannot be trimmed unless these defects show so much as to spoil the otherwise fine print. Such a negative, then, cannot be printed plain, and since vignetting it is not a very easy thing to do, on account of the very black background, we can most advantageously print it in either the medallion or the arch-top style.

Besides the above, there are hundreds of cases in which the use of the medallion and arch-top are indispensable. To some the making and use of the medallion and arch-top are a source of continued trouble and vexation, and the successful photographer is very often hearing complaints from his less-skilled brother photographer of his inability to make and use them satisfactorily. The reason of this is because he is careless as to what he uses in making or cutting them out, and not using them rightly after they are made.

Mr. John L. Gihon, a well-known photographer, knowing the difficulty which many have experienced in the making and use of the medallions, has made for the trade some very fine medallions and masks or "cut-outs" of different sizes. To those who are unable to make them for themselves, or those who prefer to buy rather than to make them, we recommend the use of his, believing they will fully meet the expectations of the purchaser.

The common card oval ferrotype mounts are very often used by some photographers in the making of the medallion and mask. Some use a knife and cut around on the inside of the mount; but as the soft cardboard is very readily made nicky, and thus gives this nicky appearance to the "cut-out," this way of making them is not advisable. It is better to buy such as are neatly made, like Mr. Gihon's. In the place of using a knife and cutting around on the inside of the mount, some place this mount on a piece of sensitive *plain* paper and print the inside of it quite dark, thus leaving the unexposed part of the paper white. After cutting a little on the circumference of the dark inside with a sharp knife the rest of the mask is carefully cut from the medallion with a pair of shears, the point of which is pressed through the aperture made by the knife. The cutting of the medallion and mask in this manner requires a very steady hand to have the result of your labour worth using.

In making the medallion or arch-top I have always used brass mats of different sizes. These mats or guides are perfectly even and true, and are made of metal, so as to permit the knife being used around the inside without any material damage to it, if only ordinary care be exercised in its use. The "cut-outs" are made of different sizes.

The regular size for ordinary card work, when the head is not the so-called "Berlin," should be $2 \times 2\frac{3}{4}$ inches oval. A size smaller is used when we do not wish to show as much as in the other size—$1\frac{3}{8} \times 2\frac{5}{16}$. A size very much used for small heads is $1\frac{5}{16} \times 1\frac{3}{4}$. One of the most convenient of all the different sizes is $\frac{7}{8} \times 1\frac{1}{4}$. It is most

* From *The Practical Printer.*

excellent for the purpose of printing negatives of babies, taken sitting in their mothers' lap. A *carte* arch-top, size about $1\frac{5}{8} \times 2\frac{3}{8}$ inches, is about the only size or style of arch-top that is used for the *carte de visite*, and for other sizes your taste will dictate, such as the Victoria or the imperial.

Common yellow envelope-paper is best to make these medallion and arch-top "cut-outs" of, as this paper utterly excludes all light that will discolour the sensitive paper. If you prefer to use sensitive paper that is not fit for printing purposes always use the *plain* and not the albumen paper, because the latter will curl up considerably—so much so as to make it very troublesome to handle.

When you have selected your paper, and have laid it on a glass, then place your brass mats on the paper, and with a sharp knife cut a *quick, clean,* and *even* cut around the opening on the inside, leaving sufficient paper on all sides of the mats for the purpose of masking the sensitive paper in printing the different sizes—such as the *carte de visite*, Victoria, imperial, or larger sizes, as the case may be.

In cutting the last part of the medallion or arch-top considerable care should be given to see that the knife enters in at exactly the place where you first commenced to cut, because often at this part of the cutting there is apt to be a nick in the cut-out if it be not carefully guarded against. The cutting-out of these medallions and arch-tops may probably be very difficult at the first few attempts of the beginner, but if he persevere he will find that a little practice will soon enable him to do it successfully.

Every mask or inside will fit its own medallion or outside (*i.e.*, the one that it was cut out of) *better than it will any other one, and if the printer will remember this I do not think he will ever meet with anything but good results.*

When the "cut-outs" are cut, and *before they are moved*, they should be marked in such a way that the printer can find the mask that was cut out of any particular medallion at will, for this is *absolutely necessary* if he wishes to obtain beautifully-shaded lines on his prints. The way I always do this is to mark on one end of the medallion "H," which means the head of it, and directly under it some name by means of which I can easily tell it from the others of the same size. On the *same end* of the mask, and on the *same side* of the paper, we also mark "H," and directly under this the name which was written on the outside from which the mask was cut.

To explain more understandingly what I mean, let us suppose that we have finished cutting a medallion and mask and that they lie before us just as cut. Now, on the upper part of the outside we will mark "H," and directly under it, and also on the outside, "Heathen Chinee." Now, also, on the upper part of the mask we mark "H," and under this "Heathen Chinee." I will remark here that it is very essential to have the marks on the *same side* of the paper, and also at the *top* of each. The importance of this will readily be seen further on, when the crescent line is to be shaded on the print.

I spoke above about care being exercised in making "cut-outs" that the knife enters in at exactly the place where you first commenced to cut, because often at this part of the cutting there is apt to be a nick in the "cut-out" if you are not careful to avoid it.

In laying the outside on the negative to print from, *always lay the side marked "H" up and close to the negative, leaving the unmarked side of the paper for the sensitive paper to come in contact with.* In laying them on considerable care and judgment should be exercised, so as to give a proper balance to the position and proportion to the print. The principal faults that occur in laying these medallions and arch-tops on the negative for printing are—1. The head is apt to be too high up or too low down in the medallion or arch-top. 2. The body looks as though it was either falling backwards, forwards, or sideways.

The nose or the mouth, as a general thing, should be in the centre of the opening, although this is, of course, open to exceptions.

To avoid the necessity of having to place the medallion on the negative for every print I stick the corners on the negative by means of very little of a thin solution of gum-water. I use it thin so that it it will readily come off when you wish it, but will adhere to the negative without any trouble or danger of slipping while the boards are being filled. In case it does not come off, damp the place a little with your tongue. In sticking the medallion on to the negative only stick it by the extreme tips of the two upper corners.

Now, a print having been printed in the medallion, which we will suppose to have been the "Heathen Chinee," we will proceed to shade the crescent line on it. Take a nice piece of glass of suitable size, care being taken that it has no bad bubbles in it, and lay the *marked* side of the mask on it, after having previously wet the *centre* of it with a little gum. The drying should not be hurried up over a flame unless the paper with the glass is *under pressure* in the printing-frame, because it it not apt to dry *smoothly* unless it is done in that manner.

The air-bubbles between the surface of the paper and that of the glass should be rubbed away with the finger before drying. In laying the gum-water on the paper do not touch a place larger than the nail of a little finger. When the gum on the paper is dry the glass should be cleaned on both sides, and then laid on the print that is to have the line shaded on it, the whole of which is then to be laid on a flat printing-board.

There is considerable difference of opinion as to which side of the print the line is to be shaded; but the majority of photographers agree that it ought to be on the side of the darkest part of the face, so as to give brilliancy and vigour to the print on account of the contrast. The size of this line varies according to the intended size of the finished print. Avoid *large lines* on *cartes-de-visite* prints.

On large prints, such as 11×14, &c., a proportionately large line is wanted, and when done nicely the effect is really beautiful. The size of the line on these prints, 11×14, should not be more than one-fifth, or less than one-tenth of an inch wide at the widest part. For 14×18 the size should vary from one-fifth to one-fourth of an inch wide at the widest part. For imperial cards the size of the line should be about one-twentieth of an inch; and for the small cards the size should be about one-thirty-second of an inch wide.

Having determined as to which side of the print the line should be, the exact place on the side is governed by the direction the light falls on the face, and which is only ascertained by the studying of the negative or print. The way I should advise the beginner to shade the crescent line is as follows:—Lay the inside or mask on the print so that it will cover exactly every part of the printed picture, leaving only the white outside exposed, which, if you were to imagine the medallion or arch-top to be laid exactly on the print as it was in printing it, you will see that the *mask lies exactly in its own medallion or arch-top* as it did when it was cut, and consequently a splendid and true line can be obtained. In laying the mask on the print, always have the end marked "H" up to the head of the print, since the end marked "H" of the outside or medallion was placed at the head part of the negative in printing the print. Always bear the above remark in mind, and considerable annoyance in printing these styles of prints can be saved.

Now, as you have the mask fitted exactly on the print, try in one move to place the mask over in the direction you have decided upon having the crescent line to appear. In moving this over there will be a dark line on the other side of the print, which should, in all cases, be *exactly as large as the intended white line.* Bear this in mind.

The reason why you should be careful and have the mask placed over in the right direction in one move is because you will be more apt to have both lines alike; for if the mask lie in a different direction from what the outside did in the printing the result would not be so good. It is for this reason that I have advised the beginner to have his mask fit the print before he moves it to shade the line, and also to move it in one move, as this will give the desired result without fail.

The required shade in printing the border of the print is ascertained by looking at the background, and then permitting it to darken as near half-way between white and the tone of the background as you can judge. Many photographers prefer to have it tinted very slightly. If the background be very light, then print the outside black.

In shading the print never let the background and the border be of the same shade, for it will make the print appear flat and feeble. Failures in this direction are as common in medallion printing as bad and irregular lines, and a printer who does not take care to prevent the one rarely does the other, for they generally go together.

I do not give the above as anything *entirely new*, but, judging from the very bad, irregularly-shaded medallions and arch-tops that are too often seen, I think it could be adopted by many with profit.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The annual trade holiday and excursion, under the auspices of this Society, occurred on Thursday, the 30th ult., when nearly every photographic establishment in the city was closed. The excursion on this occasion was arranged for Amisfield Park, near Haddington, to which place the party, about eighty in number, proceeded per rail, starting at 9.50, and arriving a little before eleven o'clock, a.m.

Amisfield Park, the property of Lord Elcho, lies about a mile east of Haddington, and is probably one of the most delightful places, for picnicing purposes, within a radius of fifty miles of the city, consisting, as it does, of a practically unlimited extent of level, fresh, velvety turf, intersected by the Tyne, and beautifully shaded by fine old trees, the interlacing branches of which screened off the hot sun, and formed in many places glorious cathedral-like spaces illuminated by a "dim, religious light," and refreshing as a refuge from the scorching heat of a July day. Through the kindness of Mr. Ramsay, the tenant at present in possession of the estate, the well-preserved waters of the Tyne were thrown open to those of the party whose tastes lay in the direction of the rod and line, and very shortly after their arrival several artificial flies were skimming over the surface of the stream; but, so far as could be learned, the trout declined to rise.

The landlord of the George Hotel, who was purveyor for the occasion, had spread the tables under a few of the largest trees; and at noon the luncheon signal was given, when, by way of fortifying themselves for the labour of the day, full justice was done to what the host had provided.

After luncheon the assembly was photographed by Mr. George Campbell, and then it broke up into parties of twos and larger numbers, who enjoyed a stroll through the grounds until the strains of welcome music brought back most of the younger, and some of those who were young only in spirit, to the enjoyment of the dance, which was kept up with unflagging zeal till dinner-time. For those who did not care for dancing several games had been provided; and so all "went merry as a marriage bell" till dinner was announced, when what might be called the "heavy" business of the day commenced.

Mr. Thomas Knox, J.P., who, along with his wife, had honoured the company by his presence, was, in the unavoidable absence of the President, enthusiastically called to the chair, and Mr. Colin Sinclair, the Honorary Secretary, acted as croupier. The dinner arrangements, which reflected much credit on Mr. Stevenson, the purveyor, were eminently satisfactory and thoroughly successful; and, as soon as the rattle of knives and forks had somewhat subsided,

The CHAIRMAN rose, and said that he knew that they were all anxious to be again up and doing, and therefore he would not detain them with long speeches. There were, however, three toasts which they could not leave the table without honouring. The first, as loyal subjects of the best and most beloved of Queens, was of course that of the Queen herself, which he knew would be responded to right loyally.

After the toast had been duly honoured the national anthem was sung in a way only done under similar circumstances.

The CHAIRMAN said the next toast was, of course, the toast of the day—"Prosperity to the Edinburgh Photographic Society." Although he had now for a number of years been a member of the Society, his numerous engagements, both public and private, had hitherto prevented his joining the members in their annual excursion; but on this occasion, when he received the "billet," he found that he was free for the day, and at once resolved to come, and he was heartily glad that he had done so. The sight before him was one not easily to be forgotten. He did not envy the man who could look unmoved on such a large number of happy faces—faces made happy by the innocent enjoyment of healthful exercise and happy association under heaven's glorious canopy, and amidst nature's most beautiful works. To him such a scene was a noble teacher, exalting the conceptions and purifying the heart, bringing them more and more into loving harmony with human nature, and so into closer communion with its great Author. He thought the Committee had counselled wisely in recommending Haddington to be the scene of the excursion this year. Haddington was really classic ground, in the highest sense of the term—in the sense that it had produced many men who had made their mark in the world, and of whom any country might well be proud. He would not detain them by going over a list of those men, but he could not sit down without mentioning one—the greatest of living Scotchmen—Thomas Carlyle, the Chelsea prophet, perhaps the noblest thinker and most powerful writer of that or any other age. It was yet fresh in their minds that, while he was with them in Scotland receiving all the honours that it was possible for them to bestow, the hand of death was, in the mysterious dispensations of Providence, permitted to strike down her who had been long his stay and helpmate, and cast a shadow on his noble life never to be altogether removed. Those of them who, on their way to the park, paid a passing visit to the cathedral, as they stood beside the grave of that loved one, and read the simple but touching inscription which told almost a life's history in a few words, must have felt it difficult to restrain the tears which, under such circumstances, come unbidden, but hardly unwelcome, to the eyes of all whose hearts were in sympathetic union with their fellow-men. Those present who were not members of the Edinburgh Photographic Society owed a deep debt of gratitude to that body for the opportunity thus afforded of enjoying at least one glorious day in the year. On the other hand, they who were members felt hardly less indebted to the many friends—especially the many fair friends—who had so graciously joined them, and added that nameless something to the trip which went so far to ensure success. Let them, then, unite their voices in three ringing cheers in wishing continued prosperity to the Edinburgh Photographic Society.

When the enthusiasm had somewhat subsided, at the request of the company the Chairman sang "Scotland yet."

The CHAIRMAN then said there was just one more toast which they must not forget—the health of their two Secretaries, Mr. Colin Sinclair and Dr. John Nicol. He need not say who they were, and what they had done for the Society. Their names were, amongst the members at least, household words, and therefore there was no need to say anything in commendation of the toast. The success of societies generally, and the success of excursions especially, depended almost entirely on the secretaries; and the success of that day, as well as all their previous successes in the same direction, showed in an unmistakable manner that they were the right men in the right places.

When the toast had been duly honoured,

Dr. NICOL said, in reply, that, although the offices of Secretary and Corresponding Secretary were by no means sinecures, the salaries attached were more than sufficient reward. To have a hand, and a tolerably large hand too, in the management of a Society of nearly three hundred members, which had for well-nigh fifteen years done its fair share of good work, and in which, from first to last, there had never been a jarring note or even trifling misunderstanding between any of its members, was, he humbly thought, something to be proud of; and when he looked down the table at the happy party in the fullest enjoyment of their annual holiday, he was sure he could speak for Mr. Sinclair, as well as for himself, when he said that such a sight would amply reward them for any labour they could possibly bestow on the business of the Society. He concluded by moving a hearty vote of thanks to the Chairman, which was enthusiastically responded to.

Mr. SMALL then proposed the toast of "The Ladies;" and

Mr. DOBIE humorously responded to the toast.

The party then returned to enjoy either dance or game as suited their fancy. Shortly before seven o'clock the signal for assembling was given, and the glee party of Messrs. Ross and Pringle's establishment, of whose musical ability we have frequently had occasion to speak, favoured the company with some excellent concerted music and solos; after which three cheers were given for Mr. Ramsay, through whose liberality access to the grounds had been obtained, and the homeward march was commenced. The party left Haddington at 7.30 and arrived in Edinburgh an hour later, highly delighted with the day's proceedings.

Correspondence.

A LARGE PHOTOPOLYCHROME BY M. VIDAL.—THE DUST PROCESS.—THE YELLOWSTONE REGION.—WELSH SCENERY.—FRENCH BATHING COSTUME.

AFTER an absence of four months I am once more addressing the readers of this Journal from my old home in Brittany. The first object that met my eye on returning to my long-deserted *salon* was a handsome present from M. Léon Vidal, viz., a large photopolychrome, done by himself by his new process—a really marvellous production, not merely as a specimen of a new and singular method of printing in pigments, but on its own abstract merits. It is a copy of a painting by Carl Muller, and has not a fault which I can discover. It is as beautifully finished in every respect as a copy in colours can be, and leaves nothing to desire. It measures about 10 × 8, and contains three figures with a landscape background. The subject—possibly *Faust and Marguerite*—does not clearly explain itself—at any rate not to my dull apprehension; but one of the figures, who is a gay knight with a sword and cloak, appears to be doing the agreeable to a young lady of angelic beauty, and persuading her to flee with him, which she seems half inclined to do, whilst another young lady of equally angelic pretensions is looking on, and holding up one of her gloved hands in amazement, whilst in the other she carries a highly-ornamented pitcher. There is a good deal of snow upon the landscape, and an old castle gate in the background, with a flight of steps leading to it. The colours are "neat but not gaudy," and the result is nothing short of a great success. In a letter received lately from M. Vidal he tells me that he is introducing improvements in his process every day, and is succeeding to his heart's content. From *his* point of view there seems to be every probability that the process will one day be a great commercial success.

The editor of the *Bulletin* of the Photographic Society of France states that a proof sent to him by M. Vidal, too late for exhibition at the last meeting, proves that he has made great progress in his process since the date of the specimens which he sent to the exhibition at the Palais de l'Industrie, and for which he was awarded a medal.

It appears that the Photographic Society of Vienna awarded, in February last, a gold medal to M. Obernetter for his blacklead process. M. Geymet has protested against this, and has proved that the same process was demonstrated by himself at a meeting of the French Society in 1872, and was published in the same year in his *Traité de Photolithographie*. This is true enough, for I have his work before me; but he must remember that the *principle* of the process was discovered by M. Garnier many years prior to the date named.

It has been proved that if a sheet of paper be immersed in an ammoniacal solution of copper (Schweitzer's liquid) it becomes, when dry, impervious to water; and if several such sheets be immersed, dried, and then rolled together in a press, they form a sort of waterproof cardboard, of which cameras, lens-mountings, &c., might be made.

Where to go with the camera is just now a subject under consideration with many readers. Should any one of them feel disposed to embark professionally on an important photographic excursion by which, perhaps, some thousands of pounds may be made, I would refer him to an article which appeared in the May number of *Chambers's Journal* on the wonders of the Yellowstone region—a part of the world amongst the Rocky Mountains of North America which has only just become known to explorers, and which seems to abound with the most magnificent subjects for the camera. But for the benefit of more humble tourists, who have, perhaps, only a few weeks at their disposal for a holiday trip, as a relaxation from the sterner cares of life, I will venture to offer a few words in favour of a part of our own beautiful island which I have just visited, namely, North Wales; and will fill the remainder of this letter with a log of my own trip home by the above route from Chester, for there is nothing like writing from one's own practical experience and observation.

It is just a week since I left Chester by the five p.m. train for Carnarvon, the route lying along the edge of the sea nearly the whole distance, and being probably the prettiest line of railway in England.

My fellow-travellers consisted of three Welshmen, who were conversing in the "lingo" of the ancient Britons, and were uncommonly merry, and a young Englishman, who seemed to be bowed down with fatigue and dejection. This went on until we reached Abergele, where the Welshmen got out, and I was left alone with my jaded companion. And now I was doomed to witness a proof of the infinite value of photographic portraiture; for presently this poor young fellow pulled out of his pocket a *carte de visite*, wrapped in a piece of dirty paper, and after looking at it for a minute or two burst into a flood of tears! Of course I interposed with some sympathetic remark, which elicited from him a full explanation of the cause of his grief. He handed to me the *carte de visite*—a miserable one, badly coloured—and told me that it was a portrait of his young wife, to whom he had only been married four months; that she had died suddenly in Ireland whilst he was in Berlin; that he had received a telegram of the event, and had been travelling night and day to be present at her funeral. That dirty, tear-bedewed, fading, miserably-coloured paper *carte*—taken by a tenth-rate photographer at some little watering-place during their honeymoon—was all that remained to him as a portrait of the deceased. The moral of this little tale is obvious enough. What would that poor heart-broken young fellow not give *now* for a good glass positive or daguerreotype of his wife, taken by a first-rate artist, and enclosed in a suitable case? Or, better still, perhaps—since he seems to have been fond of colour—for a carbon print upon glass, coloured on the principle of *neöleo-peinture*? The longer I live, and the more I see of the world, its rapid changes, and its domestic griefs, the more convinced I become that next in value to the absolute necessaries of life, are good, permanent, untouched photographic portraits of those we love; but let them be *good* at *any* cost. Are *paper* portraits quite satisfactory from this point of view? If not, it is worth while to consider what is the best substitute for them. The question is not so much one of art, or mere picture-making, as of technical excellence and perfect resemblance combined with durability. In fact, there should be a *good* family portrait gallery in every home, renewed from year to year; for do we not all change in the most marvellous fashion? I met the other day at a dinner-party an old photographic friend with whom I had worked for a week at his own home about sixteen years ago, but had not seen since, and we did not recognise each other in the least, and had to be formally introduced! Photography alone can teach us how much we change from year to year, and it alone can furnish us with truthful *souvenirs* of those whom we love and esteem. This being the case, there can hardly be a more important serial problem to solve than how to take the best photographic portrait.

The tourist must eschew Colwyn, Penmaen-mawr, Llandudno, and all such fashionable resorts, where nature has been tortured into ugliness by civilisation, and turn off into the wilder districts, where he will find ample work for the camera. At Conway one catches a peep of a pretty little river, which can be ascended in a small steamer, and takes you into the very heart of Snowdonia and that fine mountainous region. And let not the tourist be discouraged by supposing that Wales has been already "done to death" by photographers. After looking over large collections of Welsh photographs by Bedford, Frith, and other topping men, I still think that much, *very* much, remains yet to be done, and that perfection has not yet been reached by a very long way. At Carnarvon the tourist should turn his back upon the smart villas and hotels near the railway station, and give the rein to his more artistic instincts, which will lead him straight through the town to the little Anglesey inn, by the old castle, at the harbour mouth, where he will find a civil landlady, a clean bed, and all other reasonable comforts, at a most reasonable rate.

But let him not pass the Menai Bridge station, but spend an hour or two, as I did, on the beach between the suspension and tubular bridges, where he will find a subject or two well worthy of his camera.

But the finest beach and coast scenery in Wales is that from Pwllheli (pronounced "Pootheli," not "Puzzle-the-deil," as some one suggested) to Aberdaron, along the southern side of Carnarvonshire. Here you are at least beyond the beaten track of tourists, and may smoke the pipe of peace in the shadow of contentment, for railways have come to an end. But it is worth going to see the little toy line from Portmadoc to Festiniog, which has only a two-feet gauge, and winds up the mountain like the letter S, with a gradient of about one in a hundred. They say that in places it winds so much that the guard in the last van can light his pipe at the engine fire!

Welsh scenery is rather beautiful than grand. The mountains are great lumping mounds which an active young fellow may run up on one side and down on the other to give himself an appetite for breakfast. Once in my palmy days I walked over the mountains from Bangor to Llanberis to luncheon, and thence up and down Snowdon before dinner. Vastly different from all this are the Matterhorn, the Jung Frau, and Monte Rosa, the peaks of which are to most ordinary mortals as inaccessible as the mountains of the moon. But photography seems to deal more genially with the beautiful than with the sublime—for which we appear to want quite a new set of appliances, to be discussed when the proper time arrives.

Leaving Wales I turned my steps homewards *viâ* Southampton, and thought the whole route through Old England extremely tame. At Banbury a brother of the black art got into the carriage, with two boxes of negatives. We had a long chat about photography, in which he treated me as one of the "know-nothings," and smiled at some of my wisest suggestions; but most when I asked him if he worked with the new emulsion process upon dry plates. He had been taking views of a large educational establishment, portraits of the pupils, &c., in groups. Some prints of these which he showed me were very good. He lives at Croydon, and is a zealous member of the fire-brigade at that place. Evidently putting out fires was as much a hobby with this gentleman as coating and developing wet plates.

At Oxford our conversation was interrupted by the entrance of a gang of card-sharpers, whose attempts to inveigle us into betting upon the "knave of hearts" were as amusing as they were transparent.

From Southampton to St. Malo was but a thirteen hours' passage, and I found myself in another climate and another world—a climate all glare and heat, and a world all gaiety and politeness. The transition is really remarkable. The tide was coming up, and I spent a couple of hours upon the beach amongst the bathing machines and the bathers—a most amusing scene. Men and women, boys and girls, all in tunics and trousers, with bare arms and legs, romping together in the water—and many of these form the *élite* of Parisian society. I could not help remarking how pretty the young girls looked in their bathing costume, with their hair flowing down their shoulders, and thought how "jolly" it would be to photograph them. Why do women and girls persist in wearing long dresses and ugly bonnets, when the lines of their pretty figures are set off to so much greater advantage in the kind of costume which I describe? and why do they dress their hair so hideously? I talked all this over with my friend Mévius, at Rennes, as I passed through and spent an hour with him, and suggested to him that, as he has now got a studio at St. Malo during the season, he should persuade his fair sitters to be taken in their bathing-dress, if only by way of contrast to their Parisian costume; but he shook his head gravely and declared it would not do. I am certain, however, that Adam-Salomon would try it, and set the fashion. Try it yourself, dear reader, and when you return from the seaside studio to the London one, in November, with your pocket full of bank-notes, thank me for the valuable hint I am now giving you. But you must go to a *French* watering-place; for women bathe in sacks in England, and not in pretty tunics and trousers.

And yet friend Mévius is a great patron of novelties. I found him in raptures with the rotary burnisher—a French one, for cabinet size—and we burnished some *cartes* together. They were first rubbed over with alcohol containing a little soap, then dried, put upon the hot plate, and passed through the machine. It is rather a delicate operation, and only neat and careful operators can succeed with it, clumsy fellows being sure to come to grief.

I found him, also, cutting out ovals with a little steel wheel, and cutting glass with the same kind of instrument instead of with a diamond.

He is greatly in love with the Lambertype mode of enlarging, and sends his negatives to M. Liébert to be done. I saw a splendid specimen of the process. The enlarged print is not retouched at all, but only the negative; and the mode of doing that is a secret. The positive from which the enlarged negative is taken is printed in carbon upon glass. For those who like pretty and flattered portraits all these dodges are most valuable, and bring grist to the mill of the photographer.

I have just received a visit from the Professor of Geometry at the college here, who has consulted me on the subject of publishing, with the aid of photography, a series of about 200 original designs which he has made for coloured windows, in geometrical patterns. He wants to know whether there is any cheaper process than ordinary engraving for copying these designs. They measure about 8 × 3, and are most elaborately finished. Nothing can exceed their perfection as mechanical drawings. The question is whether any process of photolithography or helio-engraving would render the lines as fine and as sharp as in the original, and at what price about 200 proofs from each plate could be delivered. Can any of my readers kindly give me an answer to these questions? The answer will have an interest for many of us, since it will decide how far the present processes of photography in fatty inks are available for a commercial purpose such as is intended.

The Photographic Society of France has now held its last meeting for the season, and will not meet again until November.

M. Puttemans is about to try his hand at the process of *neöleo-peinture* upon glass, the prints being in carbon, as I suggested some weeks ago both in this Journal and in the *Moniteur*. THOMAS SUTTON, B.A.

Redon, July 31, 1874.

ON BLURRING AND HALATION IN BROMIDE PLATES.

To the EDITORS.

GENTLEMEN,—Parochial work has prevented my sooner sending the present communication on blurring and halation. Before I enter directly upon these phenomena, permit me briefly to refer to some remarks which Mr. J. W. Gough and yourselves have made on my former statements.

Mr. Gough somewhat superciliously puts aside my conclusions drawn from the fact that bromide plates containing a large excess of silver may be put directly, and unwashed, into a preservative of beer and pyro. by the remark that beer always contains chloride of sodium, which neutralises the nitrate of silver, and so accounts for the plate and beer both retaining their brightness. I do not know where Mr. Gough gets his beer; but I cannot detect any salt in mine, as I should certainly have done the moment my plate got into it. He ought, however, to have noticed that I included Colonel Wortley's preservative, which contains no salt; and I have since put the plates into mere pyro. and water without any discolouration. After two or three dozen plates have been put into the beer preservative the colour will darken next day, owing to tannin and pyro.—not, certainly, to chloride of sodium. We ought to give one another credit for common sense.

Your own observation arises from my brevity in stating the facts. I said I had never had occasion to back my plates since I put yellow paper behind; and you remarked that unless the paper were in actual contact with the surface of the glass it could not correct the effect of the white light reflected from the back. Now, that supposes that it is the reflection from the back of the glass, and not from the substance placed behind it, which causes blurring. But that is exactly the point in question. Let us first come to an understanding as to what "blurring" and "halation" are. I call them two quite different things. By blurring I understand a general fogging, more especially about the centre of the picture where the light is bright. By halation I understand that peculiar, strong fog, sometimes amounting to solarisation of light, which generally obscures the edges of every bright opening into a dark room, valley, grove of trees, &c. This latter phenomenon, I greatly fear, can never be prevented. I have found it just as strong in the Liverpool plates, which are backed enough for anything, as in mine without any backing. I believe it to be dependent on the waves of light themselves, when, like waves of water coming through a narrow sluice, they expand directly they are through*—at all events, backing does not stop it.

But, as regards blurring: I have long been of opinion that it is not owing to any reflection from the back, but either from imperfect transparency in the lens itself when too large a stop is used, or from reflection from the opaque back placed between the plates, which, even when as black as you can make it, reflects a good deal of white *diffused* light. It has occurred to me, more than once, that any reflection there may be from the back ought not to take the shape of blurring, but of a phantom image, doubling the lines, nearly coincident with the primary image at the centre, but diverging more and more towards the extremities of the plates as the angles of incidence and reflection increase; that is, supposing the emulsion coating to be *very transparent*. But if the emulsion coating be sufficiently opaque to receive a visible image, like ground glass, then a bright back ought merely to reflect this image directly back, line for line, and so to *intensify* the image. In order to set this question at rest

* Perhaps this is identical with the phenomenon in optics called "interference."

I will leave you to judge of the sufficiency of the following experiments:—I took—1. A plate *backed* with red ochre. 2. One without any backing, but with yellow paper behind it. 3. One without backing, with *white* paper behind it. 4. One with a most beautifully *silvered* back (by Liebig's process), *so bright that no looking-glass could surpass it*. Pictures were taken and developed with the same stop and exposure upon all these. The results were as follow:—

Between 1 and 2 I could discern no difference; there was no trace of blurring in either. 3 was entirely blurred in all the high lights; everything at all near the sky line was obliterated by fog. But the result in the case of No. 4 surprised me immensely. *There was not the slightest trace of fog nor of double image in any part of the picture!* Every line in the image was perfectly sharp and clear, and *very much intensified*. Only the sky was *so over-exposed as to be very transparent* and difficult to intensify. Now, I do think this experiment is conclusive. The white paper reflected back diffused light, and exaggerated very greatly the blurring effect; whereas the silvered back evidently reflected back the image on the coated surface, by direct rays, perpendicular to each surface, and so intensified every bright line. As regards the emulsion surface it was moderately transparent—perhaps as much so as ordinary ground glass.

It will be easily seen that the sky would receive nearly double its usual degree of light from the bright reflection from the back looking-glass; still, I assure you, the line next to it, which was the roof of a large house, was as sharp and clean as I ever saw one! So much for blurring.

With respect to halation, I have never been able to prevent it. The light coming through a window when taking an interior, the glare through small clear openings in dark foliage, the glittering fissure through which a waterfall comes into a dark ravine, or even the light coming over the top of a mountain into a gloomy valley, like the Devil's Punch Bowl, Killarney, will always produce halation, back your picture as you will; and I do not believe it is the result of reflection at all, but in the very nature of the burst of light itself. Indeed I fancy our own eyes detect it in the scenery as much as the camera depicts it in the photograph.—I am, yours, &c.,

Hilgay Rectory, July 30, 1874. ST. VINCENT BEECHEY.

P.S.—Mr. Stillman's discovery of a keeping, rapid emulsion, which needs no preservative, and gives a clear, dense image, will prove indeed an invaluable addition to photography. I will certainly try it; but I can hardly imagine any dry plates beating those of Colonel Stuart Wortley, especially as regards *rapidity and half-tone*.—ST. V. B.

SPOTS.

To the EDITORS.

GENTLEMEN,—Mr. Berkeley's plates, in all likelihood, owe their spots to the india-rubber. Some time since a number of uranium dry plates were taken to South Africa, exposed there, and returned to England to be developed, four months afterwards. They had, to keep the films from touching, an india-rubber ring slipped over each end, and we found that where the rubber band had touched the plate a mark of fog appeared, and that a profuse crop of spots were thrown off, as it were, from the rubber to the distance of about half-an-inch from the ring. In all other parts of the plate the development was perfect and brilliant. I know of only one kind of rubber that should be used in connection with sensitive films, and that is the pure india-rubber sold by Messrs. Rouch and Co.; but would it not be better to use triangular-shaped corners of glass?

It should also be remembered that if plates are to remain in water for a week or ten days the water must be unusually pure to start with. However pure the water may be, in very few days (at this time of year more particularly) animal and vegetable life will begin to be developed in it, and in this way spots will certainly be caused.—I am, yours, &c.,

Rosslyn House, Grove End-road, N. W., H. STUART WORTLEY.
August 4, 1874.

STAINS.

To the EDITORS.

GENTLEMEN,—Can you help me to a solvent of freshly-formed alkaline developer stains? I wish to develope out of doors with a minimum of water, and find that one ounce of water to each $7\frac{1}{4} \times 4\frac{1}{2}$ plate is sufficient, provided I could remove the stains of the developer in the evening before fixing the plates.

To begin with: I pour an ounce of water from a bottle into a small wooden dish just large enough to admit the plate (a moist one, though I see no reason why some dry ones should not answer as well), which is then rinsed in the former, and the water is poured by one corner into a developing cup. Some pyro. solution being added to it, the plate is taken out of the tray, and the development commences. Ammonia is also added after a minute or so; bromide does not seem to be often required. After development a mixture of equal parts of glycerine and water is poured over the plate, which is then placed in a plate-box with a view to fixing it in the evening.

However, I find that stains are the consequence of this method; and I now wish to hear of a solution that will remove these stains, and yet not injure the negative. I believe that such a solvent was published not long ago in your Journal, but cannot find it.—I am, yours, &c.,

Cotheridge Court, near Worcester, HERBERT B. BERKELEY.

August 3, 1874.

[It is well known that stains resulting from the incautious manipulation of the alkaline developer with bromised films are far more difficult of removal than others. Mr. M. Carey Lea and other experimentalists have recommended for the removal of this class of stains a detergent composed of a solution of iodine (in excess) in strong liquid ammonia, setting it aside for a few days until the black precipitate redissolves, leaving a clear, colourless solution. Apply this to the stained skin, alternating it with a mixture of ether and alcohol, and finishing with sand soap.—EDS.]

PHOTOGRAPHY IN THE PULPIT.

To the EDITORS.

GENTLEMEN,—Kindly allow me space to make one or two remarks on a sensational but misleading paragraph concerning "photography in the pulpit," which occurs in last week's *Notes from the North.*

"Photographers in the pulpit," being also ministers of the Gospel, let us hope, are common enough. I know one at least—a zealous nonconformist minister, whose practical knowledge of the art-science has enabled him to add largely and effectively to his *repertoire* of pulpit illustrations. One of his sermons, suggested by the conversion of photographers' waste into metallic silver, with the text "beauty for ashes," he considers the most stirring he ever preached. "Photographers in prison," albeit they are not prisoners but engaged professionally, are also, as everyone knows, about as plentiful as prisons; there are also royal photographers who frequent palaces. But when an eccentric clergyman takes to showing pretty pictures to a congregation of adults you may take it for granted that his own powers of word-painting are at a low ebb; and when for this purpose he selects Holman Hunt's picture, which has been described, not inappropriately, as "an elegant night-watchman in a surplice," and passes over time-honoured moral levers, such as *The Rake's Progress,* &c., &c., be also sure that he has not learned to "hold the mirror up to nature," whatever may be his preaching powers.

I regret to see your intelligent correspondent who writes *Notes from the North* in last week's number recommending such infantile innovations in the Presbyterian form of worship to which the bulk of his countrymen adheres, and giving your readers the hint "to set about making such pictures at once, trusting that supply will produce demand."

Did it never occur to Dr. Nicol that there are a goodly number of the profession who were men and, I trust, Christians before they became photographers to whom such gratuitous theological advice would be distasteful, and who were not as yet prepared to smoothe the way to the introduction of the magic lantern as an accessory to public worship; and would it not be prudent for us all to give these prickly points the go-by, and adopt the motto "*Ne sutor ultra crepidam?*"—I am, yours, &c., A. W. STEELE.

Leith, August 3, 1874.

EXCHANGE COLUMN.

A dark house, eight feet high, seven feet wide, and six feet long, will be exchanged for an $8\frac{1}{4} \times 6\frac{1}{2}$ Ross's C doublet.—Address, W. M. A., 57, Amersham Vale, New Cross, S.E.

Wanted, a good strong photographic van upon four wheels, in exchange for miscellaneous photographic apparatus of equal value.—Apply to MONSIEUR SUTTON, Redon (Ille et Vilaine), Brittany, France.

ANSWERS TO CORRESPONDENTS.

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

W. H. BADEAU.—Thanks.

B. H.—We are unable to answer your query.

GEO. DAWSON.—We are glad to hear of the improvement in our correspondent's health. The Journal shall be sent as directed.

G. B.—Lea's *Manual,* price 14s.; Hughes's *Manual,* 1s.; or THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1873.

G. B. B.—If you take out the patent yourself, instead of employing an agent to do so, the whole cost of provisional protection will be under six pounds. But there are so many niceties to be complied with in drawing up the specification and other papers that your best and cheapest course is to employ an agent to act for you.

J. T. L.—Two grains of bromide of ammonium will be quite enough to add to the collodion; but you must also increase the strength of your silver bath to forty grains, and allow the plate to remain in the bath for a longer period than usual to permit the bromide of silver to be fully formed. A developer of from twelve to fifteen grains to the ounce will be quite strong enough.

J. N. S.—1. The lens fulfils all that we anticipated of it.—2. The collodion has long been out of the market, but it is said that it was salted with iodide of ammonium and bromide of calcium. For the truth of this, however, we cannot vouch.—3. Those of our readers who practice the beer and albumen process will scarcely require to be told that ale and porter belong to two distinct families of malt liquors.

GEORGE STAUNTON.—Glycyrrhizine is an entirely different substance from glycerine, and to add the latter to collodion instead of the former, with a view to obtaining intensity of image, will, of necessity, prove quite futile. Glycerine is obtained from fatty bodies; glycyrrhizine from the root of common liquorice. It must be dissolved in alcohol previous to being added to the collodion. It is now seldom, if ever, used.

IGNORAMUS.—Obtain a sample of pyroxyline which will give an exceedingly tough and horny film; and let there be a larger proportion of ether than alcohol in the solvents—say three of the former to two of the latter. Methylated alcohol will, if strong, answer quite well. Collodion of this kind, although well suited for enamelling, will not answer properly for producing first-class *carte* negatives. Various formulæ for the latter purpose have been published by us for years past in nearly every ALMANAC.

CH. WALDACK (Ghent).—The article by Mr. Crookes appeared in the *Quarterly Journal of Science,* and, if we mistake not, has been republished in a cheap form by Mr. Burns, one of the publishers of spiritualistic publications in London. If you forward your full address we may possibly be able to transmit a copy to you. It will afford us very great pleasure to know more concerning Dr. Monckhoven's developer which is to enable photographers to reduce their exposures by one-half. Our correspondent adds:—"If Winstanley can shorten *that* by half there will be no more trouble in using large portrait lenses, or in obtaining instantaneous effects"—in which statement we thoroughly concur.

LUCEM.—The area of illumination depends entirely upon the length of the tube in which the lenses are mounted as compared, of course, with their diameters. It stands to reason that a ray of far greater obliquity will be transmitted through a short and wide tube than through a long and narrow one. On the same principle, when the diaphragm of a single or landscape lens is placed close to the lens the circle of illumination will be increased in proportion to the proximity of the diaphragm to the lens. Bear in mind, however, that in proportion as the area of illumination is increased from this cause the definition, except near the centre of the plate, becomes impaired.

A NEW PHOTOGRAPHER.—1. The difference between the skies of your pictures and those produced by the more experienced artist consists in those of the latter being printed-in from separate negatives. That is the whole secret. But when you again take a view of your town you must not indulge in the very questionable taste of posing a partially-dressed assistant in the immediate foreground of the picture, so as to form the chief object of attraction in that view. Persistence in such a course will ensure anything but success.—2. It is probable that the lens and apparatus you at present possess will answer very well for taking such a group as that to which you refer; but it is not to lenses and apparatus alone, but to skill, taste, and experience, that success is due. The desired information will be found in our ALMANAC for 1873. If you order the Journal direct from our Publisher you will receive it regularly on Friday morning; but if through a London publisher it may cause a delay of several days—certainly of one day.

RECEIVED.—A. Wilkinson; J. H. Fitzgibbon (St. Louis, U.S.).

THE AMERICAN PHOTOGRAPHIC CONVENTION AT CHICAGO.—The following gentlemen have been elected to serve as the officers for the ensuing year of the American National Photographic Association:—*President:* W. H. Rulofson.—*Permanent Secretary:* Edwd. L. Wilson.—*Treasurer:* Albert Moore.—*Executive Committee:* W. Irving Adams, A. Bogardus, A. Hesler, V. W. Wilcox, I. B. Webster, J. W. Black, and W. H. Rhoades.—*Committee on Progress of Photography:* A. S. Southward, W. H. Sherman, E. L. Brand, J. Landy, A. Gardner, Dr. H. Vogel, and G. W. Simpson.—*Vice Presidents:* Abraham Bogardus, New York; G. A. Douglass, Illinois; J. H. Fitzgibbon, Missouri; James Mullen, Kentucky; Daniel Bendann, Maryland; Samuel Root, Iowa; J. Lee Knight, Kansas; W. J. Baker, New York; J. F. Ryder, Ohio; W. M. Lockwood, Wisconsin; D. H. Anderson, Virginia; John R. Clemons, Pennsylvania; J. H. Kent, New York; C. D. Mosher, Illinois; C. A. Zimmerman, Minn.

OBITUARY.—Captain R. O. Aldworth, of the 49th Regiment, who may be known to some of our readers under the *nom-de-plume* of "Subaltern"—in connection with which heading many of our "Answers to Correspondents" were given—died, we regret to say, on Friday last, the 31st ult., at Beechmount, Queenstown, Ireland. We have had many pleasant interviews with Captain Aldworth since his return from India on furlough, and invariably found him to be a gentleman of an exceedingly practical turn of mind, who could not only take good photographs, but also manufacture the chemicals requisite for their production. An article by the deceased gentleman in our last ALMANAC furnishes an example of the practical character of his photographic writings, with which, however, our readers have not been placed in a position to associate the real name of the author. We much regret Captain Aldworth's untimely decease, for he was comparatively a young man. Residence in an unhealthy part of India had completely undermined his constitution.

LONDON GAZETTE, *Friday, July* 31, 1874.

PARTNERSHIP DISSOLVED.

WATKINS AND HAIGH, Regent Street, London, photographers.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 745. Vol. XXI.—AUGUST 14, 1874.

NEW BATHS AND OLD BATHS.

In our number for July 31st Mr. W. É. Batho raised a question which is of some importance; and in connection with that question we have a suggestion to make as regards the mystery—if mystery there be—to which he referred in his communication *On Theoretical Matters having a Practical Bearing on the Sensitising of Plates.*

Mr. Batho remarks that the necessity for some theorising in practical matters is obvious unless everything is expected to be discovered in a haphazard manner, and that it is the fashion to "pooh-pooh" the theorist. Now, everyone who watches the progress of science must see that chance does a little, but still very little, whilst theory does much more. But theory, backed by a fair share of practical demonstration, is really what does the work of progress.

In the article to which we have referred the author mentions the fact that a new bath does not give the best results until a few plates have been immersed, although previously iodised. The different causes assigned have, no doubt, something to do with this phenomenon collectively. For instance: the fact that when the plate is sensitised in a weak bath no subsequent immersion will make a workable plate points out a fair theoretical explanation which may be applied. Mr. Batho advocates the use of alcohol in the bath for this purpose, and we think it is one which may be applied with good results; but we cannot agree with him when he says:—"We all know that ether is not miscible with water, but is so with alcohol; while alcohol is miscible with water in any proportion, and hence when a collodionised plate is plunged into a dipping bath-holder," &c. Now, even absolutely pure ether is soluble in water to a certain extent; and when mixed with alcohol, as it is in collodion, each percentage of alcohol largely increases the solubility of the ether in water.

We are strongly of opinion that the presence of a small proportion of ether and, perhaps, alcohol, in connection with time, has a great deal to do with the phenomenon of a bath improving by a little use, and that this improvement is due to a small quantity of aldehyde being constantly formed, and which acts as an accelerator. For confirmation and the chemistry of this we must refer back to our numbers for June 5th and 12th, where this subject is fully ventilated; but as confirmatory details we will here give a short account of one or two observations we have made.

The production of an aldehyde from an alcohol is one of slow oxidation, the ultimate product being the corresponding acid. The oxygen in its first stage abstracts a molecule of hydrogen from the alcohol and forms aldehyde; and as the aldehyde is an unstable molecule it is continually absorbing oxygen to produce acetic acid. This greediness of aldehyde for oxygen is remarkably shown when we are dealing with very pure aldehyde. Water and alcohol tends to keep it, and renders the molecule more stable; but if a bottle be half full of aldehyde, so great is the absorption of the atmospheric oxygen that a partial vacuum is produced, and the stopper is removed with some difficulty. The result of the partial or slow oxidation of the alcohol is, however, always the production of a certain amount of aldehyde. The following equations represent the change:—

$$\underset{\text{Alcohol.}}{C_2H_6O} + O = \underset{\text{Aldehyde.}}{C_2H_4O} + \underset{\text{Water.}}{H_2O}$$

and—

$$\underset{\text{Aldehyde.}}{C_2H_4O} + O = \underset{\text{Acetic acid.}}{C_2H_4O}$$

As regards ethylic aldehyde, so readily is it produced by a small amount of oxidation that there is hardly a sample of spirits of wine which does not contain it, and will not more or less become discoloured when mixed with nitrate of silver and exposed to light. We are of opinion that in a nitrate bath this aldehyde is constantly being reproduced at the expense of alcohol, and particularly the ether, because such a change will take place, under advantageous circumstances, even in anhydrous ether if exposed to direct sunlight in a large vessel.

What is evidence, however, of the presence of aldehyde in the old bath? If we take a nitrate bath which is beginning to work well we shall find that it possesses an odour which is distinct from either alcohol or ether; it is, in fact, the odour of aldehyde and some other indefinite organic volatile products.

Some considerable quantity of an old bath was placed in a retort, to which was attached a receiver surrounded by a freezing apparatus, and about one-tenth of the bath was distilled over a gentle heat. The result was a distillate having all the properties of a weak solution of aldehyde, and which gave a brownish-black precipitate upon heating it with ammonio-nitrate of silver.

Again: a portion of the bath was taken and ammonia added in slight excess, and this solution was passed through a filter until it was quite bright. On heating the filtered solution a perfect metallic mirror was obtained upon the surface of the tube.

These experiments conclusively prove that aldehyde is formed; and when we bear in mind the experiments performed in connection with the reducing action—not *per se*, but conjointly with those reducers, such as we afterwards use in the developer—we can at once understand how easily the results may be very considerably modified from this cause alone. The reaction was found, as most likely our readers will remember, to be as follows, the experiments being performed by adding aldehyde in the form of its ammonia compound to the developer:—It did not act at all at ordinary temperatures upon the latent image; but when once an action was induced by an ordinary reducer—such as a ferrous salt—it was carried on by the organic substance with avidity. It acted as an accelerator and intensifier.

We should strongly recommend some experiments which shall determine the desirability of adding a very weak alcoholic solution of aldehyde to the new nitrate bath.

PHOTOGRAPHY IN THE WITNESS-BOX.

Let us anticipate and disarm hostile criticism by saying that the relation of the camera to nature is, in respect of drawing, that of truth—unerring truth; and having said this much we now proceed to inquire into the value of photographs as exponents of truth—that is, in conveying truthful or trustworthy impressions of scenes in nature.

Several years ago a London professional photographer was instructed by a solicitor to photograph a building, adding that it was required to prove so and so. "All right," said the photographer; "then I must take it at eight o'clock in the morning, when the light will be exactly suitable for our purpose." Talk of the *truth* of photography! Pshaw Photography may be made to lie like—the father of lies. Sharp attorneys seem to understand this thoroughly, and in giving instructions to the photographer whose works are to be introduced into the witness-box, as to what he desires to be proved, the lawyer recognises the potency of the photographer to aid in making black appear white.

We do not desire to introduce here a metaphysical disquisition on what constitutes truth; but we may fairly hazard the assertion that a thing may, while being literally and absolutely true, be made to leave an untruthful impression. The photographer who, by pictorial representation, conveys the idea that a duck pond is a large lake, that a mole-hill is a mountain, or that a lump of coal is a large rock —all of which is in the power of the photographer to do—is virtually "lying like truth," although he may bring the theodolite to his aid and insist upon an appeal to the strictest law of geometry.

We observe, from Dr. Kenealy's journal, the *Englishman*, that a photographer whose works were brought forward during the late Tichborne trial feels dissatisfied at the manner in which his photographic efforts have been received by the bench. Mr. Wyatt, of Fareham, Hants, had, it appears, taken a photograph of the *Grotto* —a place of some importance—during the trial. This photograph was put in as evidence in support of a certain line of argument. The prosecution, says the editor of the *Englishman* (Dr. Kenealy), if they thought fit, could have called evidence to show that the grotto was not accurately represented, but they did not dare to do so, seeing the picture was accurate to a degree; but, "knowing the vast importance of the photograph, these two judges (says the *Englishman*) resolved to do for the prosecution what it did not do for itself; and they actually made a journey to Tichborne, and inspected the grotto for themselves, and came back, and told the jury that the grotto was *not* such as it was depicted in the photograph. A more disgraceful outrage upon justice has never occurred in England. They told this in the middle of Dr. Kenealy's speech, when the whole evidence was concluded; and, knowing that they could not be cross-examined, they charged Mr. Wyatt with the crime of forgery and perjury in presenting a false photograph, and Mr. Onslow with conspiracy and subornation, and guilty complicity in both offences. Such an act as this seems perfectly shocking—almost incredible; and yet it is absolutely true; and the most shocking part of all is that England hitherto has stood by and allowed it to pass with impunity. However, the day and hour *will* come—and sooner than the defiers of justice believe."

Mr. Wyatt, however, remonstrated with the Lord Chief Justice in the following letter:—

1, *West-place, Farnham, Hants,*
20th January, 1874.

My Lord,—May it please your lordship, in last Wednesday's report of the trial of the Claimant for perjury at the Court of Queen's Bench, your lordship, in discussing the point about the grotto, made use of the following remarks respecting the photographs of that place:—"I was never more astonished in my life when I visited the place after having seen the photograph of it. I could not have supposed that the photograph could have so disguised it, and it reflects the highest disgrace and shame on the man who concocted it." I beg most respectfully to inform your lordship that I am an artist of many years standing, and am honoured with the patronage of a large circle of highly-respectable and influential people, whose good opinion I am most anxious to retain and merit. With regard to the photograph in question, I can only say that having been requested by Mr. Guilford Onslow, M.P., to visit the grotto, and take some views of it, I went, accompanied only by my assistant, and after having made a careful survey of the place I selected those parts which I deemed most suitable to give a correct view of the place. My apparatus was of a first-class quality, and I used my best judgment in taking the views, which, notwithstanding the unfavourable state of the weather, I consider successful. They were taken in the beginning of September, and consequently would not exactly correspond with the appearance of the place in the month of November. However much the severe censure your lordship passed upon me and my work may tend to injure my character and business, I have the satisfaction of knowing that I did my best by the aid of nature to produce true representations of the object. Your lordship must be aware that a photographer can only falsify by tampering with the negatives; and I am willing to submit them, either for the inspection of your lordship, or to any experienced artist your lordship may be pleased to appoint. It is with great timidity I venture to address a gentleman occupying the high position your lordship does; but I cannot help feeling that the more exalted the station and character of the censor, the deeper must be the wound to my personal feelings, and the more serious injury to my moral and professional character.—Awaiting your lordship's reply, I have the honour to be, my lord, your lordship's most humble and obedient servant, Arthur Wyatt.

Lord Chief Justice Cockburn, Queen's Bench, Westminster.

"The offer to submit the negatives is (in the opinion of the *Englishman*) conclusive, as the negatives cannot mislead; and there they are, pure and perfect as on the day when they were taken. And the judges never retracted their slanders or vilifications, but having maligned a gentleman like Mr. Onslow, and having done their best to destroy a most respectable artist, they proceeded next, with the most cold-blooded cruelty, to assassinate Dr. Kenealy."

Now, without going too much into detail, we here say we think that both the photographer and the judge may be right—the former in asserting that he took the view he was commissioned to photograph to the best of his ability, and with the best apparatus at his command; the latter in saying that he could not have supposed a photograph would disguise the place to the extent that Mr. Wyatt's had done, which reflected the "highest disgrace and shame on the man who had concocted it."

Both may be right for the following reasons:—The apparatus of the photographer, while unexceptionable in quality, and the photographer himself, while doubtless skilled in the use of chemicals, do not furnish a guarantee that the photograph resulting from the excellence of the one or the manipulative ability of the other will convey a truthful impression to the observer. It may be geometrically accurate—so accurate as to bear the most rigid test of admeasurement of its angles by means of a theodolite—and yet utterly fail in representing the object as usually seen. At a meeting of the London Photographic Society, some years ago, a view of the Houses of Parliament, taken from the opposite side of the river, was exhibited, and a well-known architect present immediately called attention to its great inaccuracy. It represented a tiny-looking pile of buildings situated on the other side of apparently an ocean of sea, and a gentleman present at the time observed that a very false impression would have been conveyed by the picture were it used in a disputed legal case, and were handed to a jury unacquainted with the scene. Yet that picture was geometrically accurate.

Views of nature may be distorted* in two ways, namely, by the selection, intentional or inadvertently, of a point of view different from that under which the object might naturally be looked for; or by the selection of a lens for depicting such view which, in consequence of its short focus, will give an undue amount of prominence to trivial objects in the foreground, and thus, by comparison, delineate in a dwarfed proportion objects of really imposing magnitude. While we think that very few photographers will be found to deliberately commit the reprehensible act of intentionally selecting a point of view with the object of deception, we do know that a very large number exist who, from error of judgment in selecting the proper lens, present a photograph which is so far from being a fair representation of a place as to be quite worthy of the strong language used by the Lord Chief Justice towards Mr. Wyatt's view of the grotto, although it is probable that, by a fuller knowledge of all the circumstances under which the photograph was taken, his Lordship would have, in condemning the photograph as a "likeness," employed language less imputative of moral obliquity on the part of the photographer.

We attribute much of the faults found in photographs to the use of lenses embracing angles of great width, and which allow the photographer to select, as the standpoint of his camera, a position by far too close to the leading object to be included in the picture. When the subject is a building, the most exaggerated perspective

* We here use the word in its moral, not in its mathematical, sense.—Eds.

results. The perspective is not geometrically untrue, but it is violent to an abnormal degree—much more violent than would be the case under the circumstances when viewed by the natural vision, and therefore morally distorted. If a view of a building be taken with a lens of this kind, so that the building occupies certain demensions (say five inches), and a second view be taken with a lens of much longer focus in proportion to the plate to be covered—this second view being made the same size as the former—we will find between them an immense difference. The former will be unpleasing from its exaggerated and violent perspective; the latter, owing to the point of view being farther removed, will be natural, pleasing, and essentially truthful.

It may now be inquired—Under what circumstances can a view be taken which will entirely exempt the photographer from such strictures as those made by the Lord Chief Justice upon Mr. Wyatt's picture? We reply that, to take any view conveying in the most truthful manner a correct idea of the place photographed, the lens used must be one giving an image subtending the same angle on the picture, when held at a distance of ten or twelve inches from the eye, as that subtended by the view itself when looked at in nature by the eye of the observer. Nothing short of this will supply the conditions implied in the expression "conveying a truthful impression." The most accurate mode of all will be to take a stereoscopic view, the lenses of the camera being separated to a distance equal to that of the human eyes, and the magnifying glasses or eyepieces of the stereoscope of such strength as to make the objects in the picture subtend the angle of vision. Against a picture of this kind no legal functionary could ever hint a fault.

As for the perversion of truth by means of combination-printing, or by the falsification of negatives, the fallacy is too palpable to necessitate any comment from us.

A REMINISCENCE OF THE CALOTYPE CLUB.

The death of Professor Cosmo Innes, noticed by our "Peripatetic" correspondent last week, recalls to our mind some long-forgotten reminiscences of what was undoubtedly the earliest photographic society in the world—the Calotype Club—of which Professor Innes was one of the founders and one of its most enthusiastic members; and, as of all that were at one time included in the membership only two remain, we think a brief history of this pioneer of photographic associations will be interesting to our readers.

Dr. Grahame, in a recent number of *Good Words*, has given a simple account of the very earliest advent of our art, in the form of paper negatives, into Scotland. He says that Talbot, after having been informed of the method of manipulation discovered by Daguerre, conceived the idea of forming a similar iodide of silver by double decomposition on the surface of a sheet of paper, and immediately afterwards communicated the *modus operandi* to his friend Sir David Brewster, who was then residing near St. Andrews, and he, with his usual zeal, not only set about experimenting himself, but managed to communicate some of his enthusiasm to his friends, the result being such an increase in the demand for nitrate of silver and gallic acid as to astonish the local chemists.

About that time Mr. Montgomery—then, we think, a member of the Scottish bar, and now Dean of Edinburgh—along with some others, visited Sir David Brewster, at St. Andrews, and being immediately smitten with the photographic mania, set about the work as if their very existence depended on success. On their return to town the results were shown and the manipulation explained, and Edinburgh was for some time in a state of *furore* and excitement difficult to be understood by the quiet workers of modern times.

The new art soon took captive in its train everybody who had leisure and many who had not. Ministers, doctors, and lawyers strove in friendly emulation to outdo each other in the beauty of their productions, each class imagining they had some advantageous peculiarity which would lead them more quickly on to perfect success. The clergy thought their greater leisure would aid them; the doctors had faith in their smattering knowledge of chemistry; and the lawyers, we presume, trusted to their superior "'cuteness." This state of matters lasted for a year or two, and the world, so far as we are able to learn, was none the worse, although there is no doubt that during that time there were fewer sermons written, fewer quarrels required the interference of judge and jury, and the people generally were pretty much left to get better in nature's own way, which, doubtless, they did.

It is not, of course, our province to say which of the three classes really carried off the palm. We know that they all did good work, and helped much to bring the process to the degree of perfection which culminated in the production of the large series of paper negatives by Hill and Adamson, which have never been surpassed, and some which we possess are finer and better in all artistic qualities than any collodion negatives we have ever seen.

It was about this time, when the excitement was at its height, that the Calotype Club was formed. It was confined almost exclusively to the frequenters of the Parliament House, and had neither laws, office-bearers, or formalities of any kind. The members were all keen experimentalists, and the object of their meeting was to exchange ideas and communicate results and experiences, with a view of each doing all that he could for the benefit of the whole. The meetings were held periodically at the houses of the members alternately, and generally each took the form of a breakfast, although when some greater step than ordinary had been made in advance it was generally honoured by being introduced to the members at a formal dinner. We have the authority of one of the surviving members for saying that the meetings were, perhaps, the most pleasant and profitable of any series he can recall during a sixty years' experience; and we can easily understand why it should be so. From the nature of things, the members necessarily were on an equality so far as social position was concerned; they were drawn together from similarity of tastes; and as they had one object in common, which formed their constant theme for discussion, perfect harmony was secured and constant progress made.

The Calotype Club, thus constituted, continued its pleasant labours through the whole calotype and waxed paper period, and on its introduction took up with its accustomed zeal and success the albumen process. Up to this time there had been one chronic source of trouble—the ladies had not been favourably impressed with the new mania. They, doubtless, liked the pictures well enough, and were even partial to sitting when a figure subject was required; but they could not be taught to admire the dirty messes which were everywhere made, or to look with favour on the illustration of the effect of organic matter on nitrate of silver, as shown by their husbands' shirt sleeves and wristbands. A little thing, however, will often effect a great change; and so it was with the albumen process. Wives and children were alike delighted with it and sang its praises unceasingly; and why? Simply because they got the yolks of the eggs with which to make puddings!

By and by, however, Archer's great discovery of the use of collodion was made, and the practice of photography was no longer confined to the few, but spread like wildfire over the country. The process was so simple that ordinary care commanded success, and so the Club felt its work was done. While it lasted it did much to promote the object it had in view, and many of its members continued to work up to the end of their lives. We think those early pioneers of the art and their connection with photography should not be forgotten, and so append a list of their names, although, as we are trusting mainly to memory, some one or two may be omitted. They were Professor Cosmo Innes, Professor Moir, Sheriff Kay, Sheriff Tennant, Sheriff Napier, Dean Montgomery, Robert Tennant, and John Stewart, of Natley Hall. Of these eight only Dean Montgomery and Sheriff Napier remain; the others have gone to their rest, leaving much good work behind.

In another page we publish a brief article by Colonel Stuart Wortley, in which he suggests, as an excellent and practical means of making pellicular negatives, the coating of gelatinised paper with sensitive collodion emulsion, which, when dried, is treated in all respects as if it had been upon glass, the finished negative being removed from the paper to which it had previously been attached by immersing it in hot water. Colonel Wortley demonstrates how thoroughly practical is this method by sending us a 15 × 12 pellicular negative obtained by the course here indicated, and which, by the way, folds up, without tearing, into the space of a small envelope. This practical mode of verifying a suggestion is of immense value, proving in the most obvious manner that the suggestion *is* practical. Since the receipt of Colonel Wortley's communication and negative we have received a suggestion of a somewhat similar character from Mr. J. A. Forrest, of Liverpool, who puts his proposal in this way:—"Suppose you take waxed paper, coat it with albumen, coagulate it with spirits of wine, and afterwards sensitise with collodion emulsion, you would gain a wonderful *portability* as compared with glass; and the only drawback would be a little longer exposure in printing. It might be done in another way by coating the waxed paper with gelatine and then hardening its surface with a solution of alum. What say you to this idea?" The idea is good; and some time ago, immediately before writing on the application of collodion emulsion to paper, we had proved it to be so by carrying it out in practice, although not precisely in the manner suggested by Mr. Forrest. We have a strong presentiment that tourist photographers will yet come to adopt paper as a substitute for glass; and we hail with pleasure every effort to popularise and simplify this application.

ACIDS IN THE DEVELOPER.

I suppose that perhaps every photographer in the country, if not every photographer in the world, makes an addition of acid to his iron developer. I certainly have always done so, and know of no one who does not. The circumstance is one which suggests a deep-seated, if not a well-grounded, belief in the *use* of such addition. I am not going to startle the reader by a statement that such belief is destitute of all foundation; but I am going to detail a few experiments which satisfy myself that the *amount* of acid usually employed is extravagantly large, and that, *perhaps*, there is no necessity for its being employed at all.

The functions alleged to be performed by acids in the developer are threefold. They are said, firstly, to restrain the impetuosity of the developer; secondly, to cause an accumulation of density in the image; and, thirdly, to prevent a certain abnormal form of deposit known as "fogging." In view of these considerations we should be led to expect, on the development of a picture in the absence of acid, firstly, an impetuous and sudden flashing-out of the image; secondly, a general weakness or want of intensity and contrast therein; and, thirdly, the abnormal deposit—fog.

In the course of certain investigations in which I have been recently engaged I found it desirable to verify the various properties of the developer, and amongst them the influence of acid therein. The collodion used, which was colourless, was that of a well-known maker. The bath solution, thirty ounces in volume and thirty-five grains to the ounce, was prepared from neutral crystals of silver nitrate, and acidified with one drop of strong nitric acid. Several plates had been dipped in it, and at the time of the experiments it was in excellent working order. A solution of plain iron sulphate was prepared—one drachm of sulphate to four ounces of water. The reaction of this solution was ascertained and found to be *slightly* acid.

A half plate scratched with a diamond was coated with collodion and plunged into the silver bath. It was then placed in the slide of a "double-backed" camera, and the halves exposed for equal times and in immediate succession to the same collection of objects. The above plain iron solution was poured on one half of the plate (which, of course, was broken for separate development) and on the other two drachms of the same solution, *plus* three drops of Beaufoy's acetic acid. The result was that the side subjected to acid development had palpably more density and palpably more detail than the side developed with the plain iron. The latter, however, was not fogged at all, so that, unless we attribute its freedom from this defect to the very minute fraction of the one drop of nitric acid carried from the bath, or to the trace of sulphuric acid, which produced the faint acid reaction of the plain iron solution, we must infer that acid is not needed in the developer to prevent fogging. More detail and more density was the verdict on that half of the plate developed with the acid solution. Was this detail or was this density a result of the acid, as such, or how? It was the thick end of the plate, or rather of the film, to which the acid developer had been applied. Accordingly, the experiment was repeated exactly as before, and in this instance the thin end of the film received the acid development. Result: more detail but not more density, as a consequence of the acid development. Manifestly the increase of density observed in the first case of acid development ought to be attributed rather to the greater thickness of the collodion film than to any action of the acid.

The observed increase of detail in both instances of acid development was, however, to say the least of it, anomalous. Surely nobody ever supposed that acids were, in themselves, developing agents, and by their addition to another solution would bring out an increase of detail. In making the development with the acid solutions it was observed that they flowed better over the plate than the simply aqueous ones. Might not this more adhesive flow give a better opportunity for the action of the developer?

A third plate was prepared and exposed as before and its halves developed—the one with two drachms of the plain iron solution *plus* three drops of acetic acid, and the other with an equal quantity of iron solution *plus* nine drops of acid. The idea in this case was to procure that adhesion to the plate which the acid evidently gives in both instances, and to detect the effects of the acid, apart from this, by the difference in quantity. Result: same density and same detail.

A fourth plate was then tried, using two drachms of iron solution *plus* three drops of acid on one side, and two drachms of iron solution *plus* twenty-seven drops of acid. Result: density the same on both halves; detail rather less on the half brought out with the more acid developer.

The final and complete conclusions from the experiments here detailed are that with the silver bath very slightly acid, collodion neutral, and plain iron possessing a faintly acid reaction—

1. That acid to the developer is unnecessary to prevent fogging.
2. That an addition of it does retard development; for with each increase of acid the image came out with more reluctance.
3. That it does not increase the density of the deposit.

In reference to the retardation, it is of very questionable desirability in the instance of a plate which has been well timed, as in such a case development stops of its own accord at the right time; but, even if considered desirable, it can, as I shall hereafter show, be obtained by other and simpler means. In short, in circumstances of collodion, bath, and iron solutions such as I have named, no acid need be added to the developer at all.

As shown by the experiment in which twenty-seven drops of acid were employed, a decrease of detail was the immediate result—a decrease which there can be but little doubt would have been still more manifest with a further addition to the acid. As there are other and more desirable methods of procuring adhesion of the developer than the addition even of a small quantity of acid it seems to me that, as a rule, any direct addition of acetic acid to the developer must be regarded as certainly unnecessary and possibly injurious.

In another article I propose to call attention to the effects of acid in the developer when the bath employed has been overworked and is surcharged with ether and alcohol from the collodion. I may premise, however, that they are substantially the same as those herein described.

As will be remembered, Mr. McLachlan, of Manchester, called particular attention, some years ago, to the fact that an absolutely neutral bath is capable of yielding the most desirable quality of negatives. I am not yet prepared to say that with all the chemicals in an absolutely neutral condition such results are to be obtained; but it does seem to me not improbable that the chief use of acids in the photography of the past has been in counteracting the effects of those numerous impurities with which the photographic chemicals of the time seem to have been particularly infested.

D. Winstanley.

NEGATIVES ON PAPER FOR TOURISTS.

Your leading article of last week is particularly interesting to me, as I have worked a good deal at the subject of transferring negatives. Will you let me call your attention to a process for tourists that I find very useful, and that those accustomed to emulsion work will find very simple and certain?

Prepare a sample of good paper by floating on a bath of warm gelatine. When thoroughly dry emulsionise, wash, and immerse in the preservative as though you were preparing a glass plate. Pin up by one corner and dry. Expose between two plates of glass in the dark slide, and develope in the usual way. Then float on hot water, which loosens the collodion from the gelatinised paper, and a pellicular negative is at once obtained.

Thus a tourist need only carry a number of prepared sheets of paper, and the transfer—or I should say "stripping"—of the negative is quite easy and certain. When the negative is quite dry it can be varnished.

I send you a large transferred negative by post with this communication. It was done with the emulsion which combines density and sensitiveness. Mr. Sutton asked in one of his letters how I managed to obtain exalted sensitiveness combined with density. I do it by treating gelatine with nitro-sulphuric acid, forming thus an organic pyroxyline. It forms an emulsion remarkably structureless and adhesive. H. STUART WORTLEY.

THE LATENT IMAGE.

IN three preceding articles, recently published in this Journal, I have endeavoured to pave the way for the discussion of the nature of the latent image in a film which is composed of a sensitive haloid salt of silver exposed in the camera, by first discussing the relative strength of affinity of the three halogens—iodine, bromine, and chlorine—for silver; and by next showing that the relative sensitiveness of the corresponding haloid salts of silver, when submitted to the same tests under the same circumstances, appears to depend mainly upon the above relative affinity. It now remains for me to complete this short series of articles by discussing the nature of the latent image—a subject which, I regret to say, has not yet been worked out to a satisfactory conclusion by abler hands.

The simplest case which presents itself for solution appears to be that of the latent image upon an exposed film of organified bromide of silver containing no free nitrate. The latent image may in this case be developed either by the acid or the alkaline method; that is to say, either by the method of precipitation or reduction. Let us, then, endeavour to find out what change the feeble light in the camera, acting during an appreciable number of minutes or seconds, has produced upon the film—which we will suppose to be a wet one, exposed as soon as the preservative has been applied to it. With an ordinary length of exposure, such as will produce a perfect negative, no change will be observed to have taken place in the film; no visible effect will have been produced upon it when it is examined by reflected or transmitted light in the operating-room. From this circumstance some chemists have supposed that no *chemical* change whatever has been produced by light in the film, but only a *physical* change; and they tell us that wherever light has acted it has more or less weakened the affinity between the bromine and the silver, which are then ready to part company on the application of the developer, in the case of an alkaline developer being used, or to attract silver from a decomposing acid developer.

The theory is a very pretty one; but, unfortunately, there are some awkward facts in its way, which make it difficult for us to accept it as true. For instance: nitric acid, as well as some other chemical agents, will destroy the latent image without producing any visible change in the film. Are we, then, to suppose that under the action of nitric acid the loosened affinity of bromine for silver in the parts which have been exposed to light is tightened (if I may use the expression) and the *status quo ante* restored? This is surely hard of belief. What other known facts in chemistry warrant us in believing such a thing possible? Then, again, a visible change *is* produced in the film if the exposure be sufficiently prolonged. Its yellowish-white colour then becomes changed to a pale red or grey. If this were *not* the case, and if *no* amount of exposure to light would darken the film or change its visible aspect in any way, then the above theory would rest upon a firmer basis; but as it is, a prolonged exposure to light produces discolouration and chemical change.

But here I may be asked what evidence is there to prove that discolouration really means chemical change; for certain substances are known to change colour without betraying any chemical change of composition. In order to set this difficulty at rest we may perform the following experiment, which will prove that when bromide of silver is darkened in the light, under water, a chemical change does take place:—Expose some well-washed bromide of silver to light, under water, in a test tube. As it darkens, the water, which was previously neutral, becomes acid.

We have now the option of two theories, and let me state each of them fairly:—According to the *physical* theory of the latent image we must believe that the film may remain for an *appreciable* time—say seconds or minutes—in an altered molecular condition without any chemical change having taken place in it until, all of a sudden, by prolonging the exposure, a chemical change *is* set up in it, which makes itself visible by a change of colour. In other words, a chemical change is preceded by a physical change of *finite duration.* But such a supposition is purely hypothetical, and is not supported by a single proved fact in chemistry that I am aware of. According to the *chemical* theory of the latent image we must suppose that a chemical change commences with the first impact of light upon the film, and that this only becomes visible when the exposure has been sufficiently prolonged to produce a sufficient quantity of darkened material to affect our visual organs; or, in other words, if the chemical change should have been preceded by a physical change, the latter must have occupied an *inappreciably* short period of time.

The difference between the two theories, therefore, turns upon the length of time during which the physical change may have lasted, whether that may have extended to *minutes* according to one theory, or whether it must have been *indefinitely short* according to the other theory. But the non-change of colour in the lighted parts of the film during a common exposure in the camera is the main stumbling-block in the way of the chemical theory. Take, for instance, the sky of a landscape. This may be reduced by the alkaline developer through its entire thickness—as proved by subsequent treatment with nitric acid, which will leave clear glass—and yet that part of the film will show no change of colour before development. How can we account for this? Into what new chemical compound can light have entirely changed the bromide of silver through the entire thickness of the film, but without changing its colour, when examined in the yellow light of the operating-room?

I will endeavour to answer this question. The altered bromide cannot be sub-bromide of silver, because that is dark grey, and is not affected by nitric acid, which the latent image is. It seems to me probable, therefore, that the altered bromide is oxybromide of silver; that is to say, a compound of bromide of silver and oxide of silver, represented by the formula $Ag\ Br, Ag_2\ O$, or, which is the same thing, $Ag_2\ Br\ O$, sub-bromide of silver being $Ag_2\ Br$. This compound would be affected by nitric acid, just as the latent image is, and would be converted into bromide and nitrate of silver. It might also be of a pale yellowish colour, which would not show in the yellow light of the dark room.

The following experiment seems strongly to support my view:—I was once developing a very thin negative upon bromide of silver by the alkaline method. Although I forced the development extremely with ammonia I could not succeed in getting printing density; on the contrary, when I held the negative up to the light before the window of the dark room I could scarcely see any trace of an image, although a feeble image was visible by reflected light. This result, I may observe, is not uncommon in the bromide process, and it occurs when the film contains little or no trace of unconverted soluble bromide. Having ascertained this much respecting the negative, I washed it, and treated it with nitric acid. This instantly dissolved all those parts which had been reduced to metallic silver, and left a transparent positive in bromide of silver upon the glass, in which the sky and high lights were perfectly clear glass.

Now what the above experiment proves convincingly is this, viz., that although parts of the film were composed of bromide of silver, and other parts of metallic silver, after the development and before the treatment with nitric acid, yet this vast difference in the real composition of the film in different parts was not distinguishable when it was viewed by transmitted light. The metallic silver and the bromide of silver had precisely the same appearance, and I could not detect one from the other. The developed image, which actually consisted of metallic silver, was undistinguishable, by transmitted light, from the bromide of silver upon which no image had been impressed. Here, then, is a case in which a known difference of composition in different parts of a film was not observable when the film was viewed by transmitted light on being held up before the window of the dark room. What right have we, then, to expect that an image should show itself before development when examined in the same way in the same dim and yellow light? Assuming that the sky of a fully-exposed negative, before development, consists of oxybromide of silver throughout its entire thickness, may not that oxybromide be of so pale a yellowish colour as to be undistinguishable from the bromide of silver where light has not acted?

But my readers may ask—Is there any independent proof that such a substance as oxybromide of silver really exists? I believe not at present. But the same remark is true of ammonium and fluorine—hypothetical substances which are frequently alluded to by chemists as existing, although the proof of their existence depends at present solely upon analogy. There is nothing improbable in the existence of oxybromide of silver—a compound of oxide and bromide of silver—because we know that chemistry affords instances of similar compounds. It is not unreasonable, therefore, to assume the existence of this compound, when the assumption seems to afford a clue to the solution of the problem in hand, and to explain the leading phenomena of the case.

But I have said nothing yet of the important part played by organic matter in the formation of a developable image, and must reserve this till next number.

To sum up what has been said in a few plain words: the sky and highest lights of an exposed film of bromide of silver consists, before development, of oxybromide of silver through its entire thickness—a substance which, being nearly of the same pale yellowish colour as bromide of silver, is undistinguishable from it in the dim yellow light of the operating-room. The supposition that the changed bromide of silver which constitutes the latent image consists of sub-bromide of silver (as Captain Abney has affirmed) is not tenable—first, because sub-bromide of silver is of a dark grey colour, and the image in the high lights would not be latent but visible; and, secondly, because the image is destroyed by nitric acid, whilst sub-bromide of silver is not affected by that acid. The supposition that the latent image merely consists of bromide of silver in an altered physical state is not tenable—first, because treatment with nitric acid will efface it completely; secondly, because a *chemical* change is proved to take place in bromide of silver when the exposure to light is sufficiently prolonged, and there is no analogous instance in chemistry of a substance remaining for a *finite time* in an altered molecular condition before a chemical change takes place in it. On the whole, the hypothesis of the latent image consisting of oxybromide of silver seems best to explain the facts of the case.

The chemical reaction by which oxybromide of silver is produced may be explained by the following formula:—

$$3\ Ag\,Br + H_2O = Ag\,Br,\ Ag_2\ O + 2\ H\,Br.$$

Three atoms of bromide of silver, *plus* one atom of water, equal one atom of oxybromide of silver, *plus* two atoms of hydrobromic acid. Water is decomposed. Two atoms of bromine take the two atoms of hydrogen, and two atoms of silver take the atom of oxygen. The strong affinity of bromine for hydrogen under the action of light is the cause of the decomposition which takes place.

THOMAS SUTTON, B.A.

THE COAGULATION OF ALBUMEN.

FOR some time a discussion has been going on in France respecting the best means of obtaining a film of coagulated albumen upon paper. As is very well known, it is a common opinion that, if a perfectly-smooth surface of this kind could be got, it would not only heighten the brilliancy of the image, but help to economise silver by preventing its absorption into the paper. There may be reason to doubt the truth of this conclusion in some respects—so far, at anyrate, as economy of silver is concerned—but it is undeniable that, whether owing to coagulation or not, admirable prints have been obtained by using alcohol in the sensitising bath, even when that bath was exceptionally weak.

As a rule, however, attempts to attain the end sought through coagulation have not been very successful, while paper—at least as made on the continent, and supplied ready coagulated—almost invariably loses somewhat in brilliancy. The only methods held to be practicable there appear to be those which involve the coagulation at the time of sensitising—such as that of M. Thierrée, who uses alcohol. Nitrate of potash has also been recommended; and one gentleman says he has succeeded with it, which has caused in a small way a resuscitation of the old battle which some years ago raged so fiercely in THE BRITISH JOURNAL OF PHOTOGRAPHY respecting the use of such additions to the bath.

We have, however, no difficulty in this country in getting good, ready-made, coagulated paper by the very simple process of steaming the sheets individually, although the demand is said to be not so great for it as its advantages, theoretical and practical, might lead one to expect. Good, coagulated, albumenised paper ought not merely to work more economically than ordinary sorts, but it ought to keep better after sensitising, and we believe does so. This is of importance to those who make their own, and do not lean upon the specially-prepared keeping paper—especially so in winter, when ordinary paper so soon deteriorates, as much from damp acting on it as from the tendency in silver salts to attack the sizing and become decomposed. Well-coagulated albumenised paper ought to be much more used for printing with than it is, and in extensive establishments would be found economical in no small degree from the number of prints which it would save. It is no uncommon thing now for a day to be wasted in endeavouring to obtain a print from a negative, which print, not being finished, has, after all, to be thrown away, because by the second day the paper has got too dark in the texture to be of the slightest use. If coagulated paper, not double-albumenised, can be obtained as fresh-looking and as brilliant in surface as the ordinary make now is it would, therefore, be extremely valuable. This is a point to which albumenisers might devote more attention. We note that a Frenchman, M. Herbert *père*, says he has succeeded perfectly. We at home have succeeded, but not quite perfectly.

ON NITRO-GLUCOSE.

No. 1.

AN ever-recurring difficulty in connection with emulsion processes is the variable nature of the different samples of pyroxyline obtainable commercially, and many attempts have been made, with more or less success, to remove the uncertainty thus arising. In working with the sensitive emulsions now in vogue this difficulty is felt even to a greater degree than formerly, the almost impossibility of combining exalted sensitiveness with proper printing density in the negatives proving a serious obstacle to success in the production of rapid work.

A few months ago, in the course of some experiments with various organic substances, I was induced to try the effect of nitro-glucose added to the collodion. This substance had been previously employed in the production of enlarged prints, the proofs exhibiting great vigour with extremely short exposures. Beyond this I was at the time unaware that it had been otherwise employed in photography; but I have found since that in the very early days of the collodion process it was recommended as an addition to the collodion for the purpose of conferring density. For some time I attempted to procure nitro-glucose in vain, so set to work to make it for myself, but with about similar success. However, perseverence conquered at last, and, as it was found to answer the required purpose extremely well, perhaps my experience with it may be of service to others.

In my first attempts at its manufacture I followed the instructions of Schonbein, given in THE BRITISH JOURNAL OF PHOTOGRAPHY five or six years ago; but the only result was the production of large quantities of nitrous acid fumes and a bulky residue of carbonised sugar. After repeating the operation several times with varying proportions of the ingredients, but with unvarying results, I tried Dr. Kemp's method of saturating a lump of sugar with strong nitric acid, and cautiously heating in a porcelain capsule. By this means I succeeded in obtaining a substance which at first I thought to be the real thing; but I found it very slightly soluble in alcohol, not at all in ether, and very slowly in water—all negative properties. Having a suspicion that my acids were not what they ought to be I obtained, after much trouble, a sample which I thought might be relied upon, and with the new material succeeded perfectly at once.

After a few experiments, to determine the safest and most economical method, I arrived at the following formula:—

Nitric acid (monohydrated).........	3 parts by measure,
Sulphuric acid, s.g. 1·84	5 ,, ,,

to be mixed at least two or three hours before use, in order that the mixture may become thoroughly cold; then take—

Finest white sugar	250 grains.
Nitro-sulphuric acid	1 ounce.

The sugar must be thoroughly dried and reduced to a very fine powder.

The acid having been placed in a basin capable of holding at least three or four times the quantity, the sugar must be added as quickly as possible, a small quantity at once, stirring with a glass rod the whole time. The sugar dissolves instantly, forming a thin glairy liquid, which gives off no fumes beyond what inevitably rise from acids held in an open vessel. Continue the stirring for three or four minutes, when the nitro-glucose will separate from the liquid—at first in small clots, like coagulated albumen. As the operation advances these may be kneaded into one lump by means of the stirring-rod and removed into a vessel of cold water.

The operation should be conducted out of doors, or, if indoors, close to the fireplace, as, in case of failure, the result, though not likely to be dangerous, is very unpleasant in a confined space. However, it is an easy matter to perceive such an accident approaching, as, if the solution change its colour to a deep orange, it is a sure warning of failure. A slight discolouration is of little importance, though it ought not to occur. The nitro-glucose may often be got safely out of the acid after the latter has reached a full orange colour, but beware of any approach to the colour of nitrous fumes.

The only requirements necessary to ensure success, are—first, concentrated acids; and, second, as low a temperature as possible. Due care being taken in these matters, the rest is very simple work—in fact, simpler than the manufacture of pyroxyline.

Nitro-glucose somewhat resembles putty in appearance; but, when cold, it is hard and brittle. The application of warmth, even so slight as that communicated by the hand, renders it quite plastic, in which condition it may be moulded into any shape or drawn out into threads of astonishing fineness. When first removed from the acid it is necessary to knead it in lukewarm water for a very considerable time before it becomes neutral to test paper; it may then be kept under water in a wide-mouthed bottle or dissolved at once in alcohol or ether. The latter plan I prefer, as I find it much more convenient to have a solution of known strength than to handle the unmanageable lumps of nitro-glucose whenever a few grains are required. Both alcohol and ether are solvents, a mixture of the two being better than either separately.

The above quantities of material should produce, if the operation be successfully performed, about one hundred and eighty grains of nitro-glucose, and this I would recommend to be dissolved in six drachms of a mixture of equal parts of ether and alcohol, so that two minims would contain one grain. A peculiarity mentioned by Dr. Monckhoven, some years ago, is that, when freshly-prepared, this solution gives no precipitate with nitrate of silver; but by keeping it at a temperature of from 100° to 110° for ten days or a fortnight it acquires the property of forming a white precipitate with that substance, which rapidly darkens when exposed to the light. This effect, I find, is produced—more slowly, however—without the application of heat, and until this decomposition has set in it should not be used. W. B. Bolton.

WHY DOES THE NITRATE BATH GET OUT OF ORDER?

That it does so there is, unfortunately, no manner of doubt, as many perspiring photographers can testify. But why? That is the purpose of this communication, in which I wish to consider the subject somewhat in detail.

It will be necessary, in the first instance, to notice the composition of a nitrate bath and the additions it continually receives during the working hours, before we can diagnose its complaints.

The nitrate bath is nearly always composed of nitrate of silver, neutral or slightly acid, dissolved in pure water. This is set in the sunlight for a few hours, the sunning having the effect of causing a deposit of any organic matter accidentally contained in the silver or water as a black sediment to be removed by filtration. The purest water usually attainable contains more or less organic matter, the non-removal of which might injure the proper working of the bath. The further addition of a little collodion will supply the requisite ether and alcohol to make it in a proper working condition, if allowed to stand for a few hours before finally filtering. It may be borne in mind that the alcohol and ether supplied by the collodion acts principally, if not entirely, in a mechanical manner, by overcoming in some degree the repellent action existing between the etherial coating of collodion on the plate and the aqueous solution of nitrate of silver into which it is plunged. When this repellent action has been overcome, and the aqueous solution has taken the place of the etherial one, the plate is considered sensitised and in a proper condition for exposure in the camera.

This process being continually repeated, the constituents of the collodion, soluble or miscible, in the silver bath, and added in small quantities at each operation, will not, although evidently altering the composition of the bath, interfere with the sensibility of the film to light or with the quality of the image to be presently developed, *unless* new products contained in neither bath or collodion originally are formed. I allude to the formation of nitrous ether and other ethyl compounds (possibly oxalic acid and aldehyde) by the action of the nitric acid in the presence of the silver salt upon the alcohol—reactions which undoubtedly take place, slowly or rapidly, as the case may be; the more slowly the longer the bath remains in good condition, and *vice versâ*. The detrimental qualities of these substances can be easily demonstrated by their addition to a bath in good condition. Their presence, however, depends much upon the temperature, a high temperature being very conducive to their formation, a sudden rise in which is well known to have very objectionable effects on a bath that has hitherto behaved in a most exemplary manner and would continue to do so in a lower one.

Depression of temperature has comparatively little or no effect in aiding a bath to become chemically disordered, the conditions necessary to the formation of a sensitive film being merely retarded; but, in the case of increase of temperature, the ethyl products are more readily and profusely formed, and the bath, in consequence, sooner disordered. An old bath containing, of course, a greater proportion of the solvents of the pyroxyline is *more easily* thrown out of gear than a new one, and has given rise to the idea that the work of a well-used bath *must be* inferior to that of a new one. This, however, is an erroneous assumption; for, until the formation of the ethyl compounds, an old bath will continue to produce work in no way inferior in quality to that of the new one if the strength be kept up to the proper standard. A bath may become disordered if a hundred plates in *rapid succession* are prepared in it, even if the strength is kept up; whereas the same number of plates sensitised a few at a time over a *lengthened period* would have little or no deleterious influence on it.

The sudden variations of temperature to which we are subject in England is the greatest difficulty with which photographers (wet-plate workers especially) have to contend. Providing 65° of heat could be regularly maintained, half a photographer's troubles would vanish.

I have laid particular stress on the formation of ethyl products, although many other chemical reactions undoubtedly take place in a compound consisting of so many varied and unstable ingredients as does the nitrate bath; but only in exceptional cases are they sufficiently important to work any great harm or to interfere with good work. The formation of nitrite of silver is an example; this will suddenly form and cover the plate with a multitude of crystals that dissolve away in the process of washing, and leave elongated pinholes, so to speak, when they rested on the film.

When this untoward state of etherisation is obtained one of the first signs is the very pronounced spot or imperfection caused by the smallest nucleus—a speck of dust, for instance. If the bath were in good order it would be limited to the size of the speck, but will now be swollen and exaggerated in a most provoking manner.

The next sign of a bath giving way is an uneven-looking image when developed, although it may print all right; then come streaks, patches, and markings of various kinds, which do print and render the negative worthless, and which are the final efforts of an expiring bath.

If a bath in this condition be strengthened in the hope of recovering it the hope is delusive, as in all probability the film will be covered with a multitude of minute black specks of reduced silver, intimating that the best treatment is to place it with the residues. I have not alluded to any extraneous matter that may be introduced and spoil the bath by carelessness or accident, the remedy for which is obvious.

But to conclude: my advice is, when a bath gets into a "ticklish" condition, from whatever cause, irremediable by sunning and strengthening or acidulating, pass it to the residues and make a new one, which, besides being more economical, will save an immensity of money and annoyance. Edward Dunmore.

A TENT COOLER FOR THE STUDIO.

Now that summer weather appears to be leaving us it may be thought rather late in the day to begin discussing how to keep a studio cool; but, if not exactly in season, the old proverbial saying may, at least, be offered by way of advice:—"Keep a thing—its use will come;" and, if this note be good, it will not fail to be helpful some time.

A French photographer, named M. Malbert, has been writing to the *Moniteur*, giving an account of a method he has employed for overcoming the inordinate heat of his studio, which we think ingenious and simple. His studio is a small one—only twenty-five feet long and eleven feet wide—erected on a roof, and completely separated from neighbouring houses. It was consequently quite unsheltered from the sun's rays except by a mere partition along the side, while the fifteen feet or so of ground glass in the roof received the rays almost direct. The consequence was that the heat in the room often rose in summer time to 113° Fah.—a heat intolerable alike to himself and his sitters, and seriously impeding his operations, threatening his health, and injuring his business.

After many abortive attempts to remedy the matter M. Malbert at last hit upon the plan of erecting an outside-tent-sort of blind at a height of about two feet above the glass roof, and so arranged that it could be drawn back at will so as to admit the full roof light. The effect of this was to at once reduce the temperature of the studio to little more than that of the ordinary heat out of doors in the shade. The roof was completely protected from the sun, and a current of air had free room to play between the glass and the blind, so that there was no danger of a heated cell forming.

But the interesting part of it is that the exposures are not lengthened by this covering of the roof. The top light may be said to be almost excluded, beyond what goes in below the blind or from the higher side lights. Except when going to perform that delightful operation—photographing a baby—M. Malbert has seldom occasion to draw back his blind. We do not, of course, know the precise build or position of this gentleman's studio; but if its side light be high, and if a reasonable amount of soft light get in under the blind, it is not difficult to understand why his exposures should not be prolonged. Under the extreme heat from which he was suffering it must have often been almost an impossibility for him to get a picture of any kind, however he might expose. At all events, his plan of cooling the studio is decidedly simple and ingenious, and might be adopted with great advantage by those who, having a north light, are yet troubled by the terrible heat which beats through the roof upon the darkened south side of the studio. Such an erection would need, of course, to be very strong, and fitted with the simplest mechanism so as to be easily furled; but otherwise there should be no difficulty about erecting it, and it might be made, with a little judgment, of much value in producing effects of light and shade. It is certainly more simple and feasible than the many water-cooling schemes of which we have heard so much, provided only that it does not block out essential lights.

The editor of the *Moniteur* speaks well of the pictures by which M. Malbert's letter was accompanied; but the latter appears to use a reflector for certain purposes to help out the effects.

FANCY PRINTING.*

FANCY MEDALLION AND ARCH-TOP PRINTING.—This fancy printing is sometimes very beautiful when the designs for making them are neat and pretty.

In selecting designs for this work be guided by good taste, and do not strive after *complicated* and *glaring* designs when the *simple* and *delicate* ones are always the object of the tasteful printer.

There are very few designs for this fancy printing more beautiful than that of the fine parallel lines we are so familiar with in the French writing-paper. Besides the parallel lines, a few others of a delicate design are used very appropriately. Always have the size of the intended prints and the fancy design in *harmony* with each other—*i.e.*, the larger the size of the print the larger should the design be, and *vice versâ*. It would be ridiculous to have large designs intended for an 8 × 10 photograph used on the common card, as well as it would be to have small designs on large prints.

I have seen a few frame photographs printed in the fancy arch-top and medallion style that I liked very much, because the design for this fancy work was so very appropriate for the size of the prints. Generally speaking, however, these designs are intended simply for the *carte de visite* and the imperial; sometimes, too, for the Victoria when that style of print is made, but they are very seldom used for anything larger. The making and use of these medallions and arch-tops intended for this style of printing are exactly the same as was described in the preceding chapter, with the exception of the placing of the paper, with the design upon it, upon the print, and then shading the line upon the print by means of the inside mask, as usual. There is also another way, which will be described further on.

The paper suitable for this work is known as the "French writing-paper," the thinnest of which should be obtained. A sheet of two or three different kinds will answer very well for a beginning. Cut the sheets up to the proper size, and, after placing your print upon a flat printing-board, put one of these different kinds of designed paper over the whole print, which will be almost entirely covered. Now take the *proper mask* and proceed to make the crescent line on the print. This is rather difficult at first, owing to the very indistinct print under the white writing-paper, which thus renders the shading of the line rather troublesome. By pressing the white paper in close contact with the print underneath in laying on the mask, and going to a part of your printing-room where you can plainly see your work, you will find that you will have no trouble whatever. In printing this *outside* let it darken to the same shade as you would in making plain medallions and arch-top prints; and what I said in regard to plain medallion printing, about tinting the border to the same shade as the background of the print, is also applicable in this style of printing, the result being equally as bad, with the exception, perhaps, in this case, that there will be a kind of a fancy flatness to the prints instead of a plain one.

Besides the above, there is also another way to print these which is, perhaps, easier, because the French paper can be dispensed with, as the glass to which the mask is stuck answers the place of the paper. A very thin negative indeed is made of, say, some moss, and developed, fixed, washed, and varnished as is usual in negative making. The masks are attached to the *face* of the negative, but it would be better if they were not stuck at all, for the negative will, in a short time, be ruined by so doing; and, after adjusting the mask, the whole is then placed out to print as in ordinary plain medallion printing. The negative being very thin, the border will darken very rapidly—as quick, if not quicker, than when French paper is used.

Printing in Grey.—This term is generally applied to photographs which have been, or are to be, printed first in the vignette style, and then the surrounding white border has been, or is to be, printed or tinted a little. The whole appearance of the mounted print is very often quite pleasing, the darker draperies, &c., of the print being of a rich warm tone, while the slightly-tinted border will be of a "*greyish*" tone. When skilfully done, this "printing in grey" is a good thing, and serves to give variety to the printer's results instead of the monotonous appearance they have in some galleries.

In the first place, in the vignetting of the negatives that are to be printed in this style, do not show too far down in the draperies, although considerable halo may be shown around the head. The reason why the draperies should not be printed too far down is, because in tinting the border the action of the light on the white sensitive paper *developes the print* in a measure where, in the first place, nothing of the draperies were visible. Bear this in mind.

While the tinting of the border of the vignette print is carried on, the lights of the print would be very much discoloured if they were not protected from the white light, and consequently a "cut-out" or mask is made, which answers the purpose admirably. To make this mask, cut a piece of spoiled sensitive paper a *very little* smaller than the figure, as regards the hair, dark draperies, &c., but not a particle smaller in regard to the face. Do not cut too far down in the draperies, or in tinting the print will be spoiled.

The print to be tinted, having been removed from the vignette-board, is then placed in a flat printing-frame, in which a clean glass has been previously placed. Another glass of a larger size is then obtained, to the under-surface of which is attached this "cut-out," and then, placing the glass so that the "cut-out" on it will cover the figure in the print, we commence to tint the border of the print, keeping, in the meantime, the glass constantly on the move. It will take about five to ten seconds to tint all that is required.

In moving the "cut-out" during the tinting of the border be sure that no part of the face is so exposed to the light as to discolour it. Always be careful not to tint the border so much as to occasion flatness. A very little tinting is all that is required.

Cotton is generally used by experienced printers in place of "cut-outs," but I should not advise the beginner to attempt it until he has had several months' experience in printing.

* From *The Practical Printer.*

PHOTOGRAPHY AND SPECTRUM ANALYSIS.*

[Cantor Lecture, delivered before the Society of Arts.]

So much for the solar spectrum. Now let me carry you on another ten years, to the year 1862. Professor Stokes, in a paper communicated to the Royal Society in this year,† refers to his former paper, and to what he had been enabled to do by means of it. He states—"A map of the new lines (the lines thus observed by him) was exhibited at an evening lecture before the British Association, at their meeting at Belfast in the autumn of the same year, and I then stated that I conceived we had obtained evidence that the limit of the solar spectrum in the more refrangible direction had been reached. In fact, the very same arrangement which revealed, by means of fluorescence, the existence of what were evidently rays of higher refrangibility coming from the electric spark, failed to show anything of the kind when applied to the solar spectrum;" and then he goes on to say that, in making observations by means of the electric spark, he had found that in the case of a spark taken between the poles of an induction coil like this on the table, or between the poles of an electric lamp such as you see here, the visible spectrum which was revealed and rendered visible to him by means of fluoresence was no less than six or eight times longer than the whole of the visible part of the spectrum. That, you see, was a revelation of the first order. He was so astonished at this that he at first thought there was some mistake. "I could not help at first suspecting that it was a mistake arising from the reflection of stray light." In fact, so astonished was he, so many methods did he try in order to break down the impossibility, if it existed, that he adds, in a subsequent part of the paper:—"I tried different methods, without being able to satisfy myself as to the accuracy of the observations, and frequently thought of resorting to photography."

Professor Stokes thought of resorting to photography; but at the moment that Professor Stokes was thinking of this Dr. Miller, of King's College (unknown to Professor Stokes) was not only thinking of resorting to photography, but had actually resorted to it, and was taking photographs of the so-called invisible part of the spectrum, in which the spectrum in the case of some substances was five or six times, and in the case of silver one might say almost seven times, as long as the spectrum ordinarily visible through glass prisms. Professor Miller goes very nearly over the same ground that Professor Stokes had done before him. He also investigates the transparency of quartz, and comes to the conclusion that quartz is almost the only substance that can be employed. Professor Miller in this paper, which you will find in the *Philosophical Transactions*,‡ also gives for the first time a detailed account of the way in which such work is done. Permit me to give you a rough notion of this method of work. We have here a spark from an inductive coil, exactly such a spark as Dr. Miller wished to examine. He had a spectroscope something like this on the table, with two important differences. The first important difference was that, instead of having two glass prisms, he had prisms of quartz; and again, instead of having an observing telescope adapted for use by the eye, he inserted a camera, or what was to all intents and purposes a camera, in the same place. So that he had, first of all, a light source by which you get an intense illumination, due to the extremely high temperature of the spark. Then you have a quartz lens, and quartz prisms, and then simply the photographic plate. Having, therefore, an entire absence of

* Continued from page 211.

† *On the Long Spectrum of the Electric Light. Phil. Trans.*, vol. 152, p. 599.

‡ Vol. cit. p. 861.

the non-transparency of glass, Professor Miller was delighted to find that, on taking this spark in this way, between electrodes of different substances, he not only photographed what could be seen, namely, a spectrum ranging from red to blue, but one extending as a rule six times the length of the visible spectrum beyond the blue; although, in some cases, it is true it is only four times as long on the more refrangible side of H as H is from the red end of the spectrum—that is to say, the line which is generally called A.

In this paper of Dr. Miller's we have the germ of all the applications of photography to spectroscopic inquiry which have been carried on since; and I am sorry to say that altogether too little has been carried on. Not only did Dr. Miller investigate in this way the radiation of different vapours, and give photographs for the first time of the bright lines of a very large number of chemical substances, but he went further than this altogether, and dealt with the absorption of different substances. He commences his paper with the absorption of chemical rays by transmission through different media—through solids (transparent of course), through liquids, and through gases and vapours, the only alteration he made in his general mode of experimentation being that, in the case of the absorption of gases and vapour, he placed the instrument further from the light source, and in the path of the ray inserted a tube containing the gas or vapour to be experimented with, as I am doing now, so that the light which passed from the spark to the telescope was compelled to traverse a thickness of vapour according to the length of the tube employed. In that way he not only determined the absorption of equal lengths of different vapours amongst themselves, but the absorption of different lengths of the same vapour; his paper is thus one of the most important contributions to spectroscopic knowledge that I am acquainted with, and I hold that the chief importance of it is the application of photography to spectroscopic observation. There is nothing so difficult, I think, as to make a proper spectroscopic observation; and, from the little experience I have had with it at present, I should think there is nothing more easy than to make what I may call passable spectroscopic portraits.

That, then, was in the year 1862. In the year 1863 we have another equally distinct advance to chronicle, but this time the work is done in France. M. Mascart—a name very well known to physicists—undertook a tremendous work, which he has not yet completed, namely, a complete investigation of the ultra violet solar spectrum.* Instead of using a quartz prism, as Dr. Miller had done before him, M. Mascart uses a diffraction grating—that is to say, an instrument by means of which the light is not refracted, as in the case of the prism, but diffracted by an effect of interference of fine lines ruled on glass. M. Mascart has shown it to be possible, by means of reflecting light from the first surface of the diffraction gratings, to get light diffracted without its going through the glass at all. In this way, therefore, you avoid altogether the imperfect transparency of the glass. Professor Mascart has gone on advancing every year, until now he has completed a photographic map, not only of the solar spectrum extending about as far as the line R, by means of photography, but he has been able to observe as far as the line called T. There he finds the solar spectrum ends; but in the case of a great many vapours, such, for instance, as that of cadmium and other metals of the same nature, he finds he can go on photographing very much further, and has been able to photograph almost as far as the eye can see; that is to say, to a distance, as I have already told you, five or six, or even seven, times as far as from the line H as H is from A. So that you see, thanks to photography, we can now photograph six times more of the spectrum than we can see of it with the eye ordinarily.

I next come to a very beautiful reflex action of spectroscopy on photography; and now I must take you back to America. I am nearly certain that every one in this room is perfectly familiar with the name of Rutherfurd in connection with celestial photography, but if you will allow me I will point my reference to him by throwing on the screen one of his magnificent photographs of the moon, which he was good enough to give me some little time ago; and I am anxious to show this on the screen, especially to show you the wonderful skill of which he is capable. Unfortunately, I am not able to throw on the screen a photograph of the magnificent solar spectrum which we owe to him, the most magnificent photograph of the solar spectrum—and I say it with the intensest envy—which I think it is possible to obtain. However, I have a copy of it on the wall, and it is well worth inspection. Mr. Rutherfurd, whose name is associated with that of Mr. De la Rue with regard to celestial photography, was not content with the reflector, the very instrument by which this beautiful photograph of the moon, which I will show you, was taken. He lives in the centre of New York, and I suppose New York is almost as bad as London for tarnishing everything that the smoke and atmosphere can get at; and he came to the conclusion that he must either abstain from celestial photography altogether or else make a lens—and a lens with Mr. Rutherfurd means something over fifteen inches diameter—which should give him as perfect an image in New York with fifteen inches of glass, as a perfect reflector of fifteen inches aperture would give him as far away from a city as you please. Mr. Rutherfurd, who never minces matters, knowing that it was absolutely impossible to get such a lens as this from an optician, who of course neglects almost entirely the violet rays—the very rays which Mr. Rutherfurd wanted—when he makes an ordinary telescope, determined to make such an one himself. He thought about the matter, and he came to the conclusion that, in any attempt to correct a lens of the magnitude for the chemical rays, the use of the spectroscope would be invaluable. He therefore had a large spectroscope made, in order to make a large telescope, and then we have just as distinct an improvement upon the instruments which we owe to the skill of those who first adopted the suggestion of Sir John Herschel, and brought together the chemical and the visual rays, as the improvement we owe to Herschel was upon the instruments which dealt simply with the visible rays. Mr. Rutherfurd simply carts away the visual rays bodily, and only brings together the chemical rays; the result of his work being a telescope through which it is absolutely impossible to see anything, but through which the minutest star, down, I believe, to the tenth magnitude, can be photographed with the most perfect sharpness. This is the instrument of the future, so far as stellar astronomy is concerned. Having thus achieved what he wished in the construction of this instrument, and having the spectroscope, Mr. Rutherfurd commenced a most elaborate research—which, I am sorry to say, he has never published, for it would be of the greatest value to any photographer or any astronomer amongst us—upon every kind of collodion which he could obtain in America or in Europe, and upon every possible arrangement of lenses. Mr. Rutherfurd found that some collodions which he got were so perfectly local in their action as to be almost useless for that reason, and that other collodions were so general in their action that they were also almost useless for the exactly opposite reason. I will now throw on the screen the line G and the lines in the green, or, rather, the lines approaching to the green near F. With ordinary collodions, such as one generally gets—that is to say, collodions not absolutely good, but free from both the extremes referred to by Mr. Rutherfurd—we want something like five seconds for the part near the line G. Well, when you go a little way along the spectrum in the less refrangible direction, you have to put minutes for seconds—in other words, the exposure has to be sixty times as long. I have another photograph of the spectrum, which will show you the part of the spectrum less refrangible than the line F to which I have referred. This photograph which you see on the screen now required very nearly half-an-hour.

Those of you who are most familiar with the solar spectrum will recognise the extreme importance of Mr. Rutherfurd's contribution to photographic spectroscopy when I tell you that, in the opinion of the best judges, his photograph of the solar spectrum is quite as admirable and excellent as is the photograph of the moon which I have just shown you on the screen. During the last year this question of the solar spectrum has again been considerably advanced by photography in America. Mr. Rutherfurd's photographs, admirable although they are, are refraction photographs—that is to say, prisms were used, and, more than this, prisms of glass. You will, therefore, quite understand that the photograph which you see extends only a very little distance beyond the lines H. But America was not satisfied with this, and Dr. Draper—the son of the Professor Draper whose name is so honourably associated with the commencement of work done in photography thirty years ago—has just now photographed a solar spectrum far beyond H. A copy of his photograph is on the wall, but, unfortunately, I have not a copy which I can throw on the screen.

J. Norman Lockyer, F.R.S.

(To be concluded in our next.)

* *Annales Scientifiques de l'Ecole Normale Supérieure.* Vol. for 1864, p. 219.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

At the first June meeting of this Society Dr. Vogel occupied the chair, and, after some half-dozen new members had been introduced, welcomed two gentlemen from Vienna—Dr. Hornig and Herr Luckhardt—with the usual complimentary language, to which the former gentleman suitably replied.

Herr Claussen proceeded to detail the results of his researches into the action of the electric spark on the photographic plate. He had allowed both negative and positive sparks to act at different times on the plate, and had then developed, with results that the positive spark gave ray-shaped and the negative ring-shaped images—a result pronounced analogous to those obtained by Lichtenberg.

Herr K. Schwier then gave a short paper upon the yellowing of varnished plates, upon which there was some discussion. He recommended a solution of cyanide as a means of restoring them.

Herr Lindner used a mixture of three parts of alcohol and one of cyanide.

With regard to the remark that these failures were only to be found in plates that had been printed from, it was objected by both Herr Reichard and the Secretary that they had seen plates that had never been used grow yellow after varnishing.

Herr Prümm, again, had chiefly observed negatives go wrong in this fashion which had been printed from too hastily after varnishing. While the varnish was yet soft silver was absorbed through it from the paper into the film; hence the defect, which he had been habituated to remove by putting the plate into a solution of hyposulphite of soda.

Herr SCHWIER stated that he easily got the matt condition with a varnish by rubbing it. One had only to take the plate and rub a portion of it with one finger for a little, when it would be found to roughen and become capable of biting under the pencil, and so proceeding alternately over the plate, and by a much safer plan than if one rubbed the plate with pumice stone.

Herr LINDNER said that might do very well with some kinds of varnish, but it would not do for plates varnished with shellac.

Herr HARTMANN thought it was a plan that required in any case a rather friable sort of varnish, which, as it was rubbed off, formed a kind of roughening powder under the finger.

The Secretary read a passage from the *Photographischen Notizen*, which set forth in graphic fashion the history of an ambitious retoucher who, taken on by a photographer as a poor artist out of work and taught the art, grew in course of time to think that his master's fame depended on his pencil, and acting on that notion spent all the capital he could scrape in starting for himself, only to find that somehow the negatives he took would not work up under the pencil to give effects like those obtained by his late employer. When too late the man found that he had mistaken his calling, and at the end of six months he was back at his old post again—a sadder and a wiser man, and *minus* all his money.

The history is a common one enough, and the evil rather prevalent; but it is not always the man's blame if he be dissatisfied, for he at least has the chance, as has been well pointed out elsewhere, of knowing more of his own branch than the person who employed him, and who is too often apt to be somewhat exacting and capricious in his demands, making too little allowance for what his servant does know, and exacting from him such covering of his own failures as is hardly reasonable.

In the course of the conversation which arose upon this passage and upon M. J. P. Braiss' notes thereon,

Herr LUCKHARDT remarked that even educated artists, if constantly kept at retouching, showed a tendency to work everything down to a state of flatness. He, accordingly, did not keep his men constantly at that work.

Herr PRÜMM said that his retoucher worked half the day at negatives and the other half at positives, as a correction of that evil. There was a good deal of danger of lapsing into over-retouching.

A question was asked as to the best means of avoiding those marblings which come upon wet plates, especially in hot weather, and were such a prolific source of trouble.

The SECRETARY said that a good plan was to damp the inside of the camera with warm water, or to sprinkle it, or put a damp cloth in it. The vapour so generated prevented the plate from drying or the marks from forming.

The CHAIRMAN observed that in his experience a weakened bath gave these markings much less frequently than a strong one, and that a new bath was freer from them than an old one charged with alcohol. Very advantageous, too—almost essential, in fact—was the employment of a well-bromised collodion, so that, while in ordinary circumstances the best proportion of bromide to iodide is reckoned one to five, when working with long exposures he had found it good to use equal parts of each.

Herr REICHARD recommended the use of two silver baths—an old and a new.

Herr LINDNER, who approved of this latter policy, said, however, that it did not make much difference so far as markings were concerned.

Herr PRÜMM then gave his experiences with the caoutchouc undercoating which had been recommended by the Chairman as a substitute for albumen. He had used both *gummi elasticum* and gutta-percha, but with the latter the solution never became clear. The plates showed an extraordinarily-clean appearance even when they had not been anywise particularly cleaned beforehand; but, unfortunately, the films did not stand retouching with an ordinary lead pencil.

The Chairman promised to look into this defect.

Herr CLAUSSEN said he had used an india-rubber preliminary coating for five or six years, and had lately observed amongst some of his plates hair-like cracks.

The CHAIRMAN reminded Herr Claussen that formerly the caoutchouc had been used much too strong, and that failures had resulted therefrom; but Herr Prümm and he should look into the matter.

After witnessing an exhibition of very fine coloured and uncoloured magic-lantern slides, conducted by Herr Talbot, the meeting adjourned.

Correspondence.

FREE NITRATE IN EMULSIONS.—BLURRING AND IRRADIATION.—BRITTANY, AND THE MARCH OF IMPROVEMENT.

I HAVE been requested by a gentleman, whose name is well known to my readers as an energetic photographic experimentalist, to offer a few words on Mr. M. Carey Lea's new formula for a collodio-bromide emulsion, which is to contain twenty-five grains of silver nitrate per ounce! Is it *possible* to introduce so large a quantity as this? That is the question. I believe it is not. The formula is, I believe, not only fundamentally wrong in principle, but impossible in practice. It is *not* possible, according to my experience, to introduce anything at all approaching to twenty-five grains of silver nitrate into an ounce of collodion. There are other parts of Mr. Lea's formula which in my hands are equally impracticable. For instance: I find it impossible to make a preservative containing both albumen and gallic acid without coagulating the albumen; and I find it impossible to introduce a film containing free nitrate into a preservative bath containing tannin without producing discolouration.

I regret to add that the only way in which I can reconcile Mr. Lea's experience with my own is by supposing that his emulsion does *not* contain any free nitrate at all. To be frank on this subject, I confess my belief that he has been inexact in his manipulation, and that the small quantity of free nitrate which he has really introduced in excess of the bromide of cadmium has been converted into silver chloride by the inexact quantity which he has added of *aqua regia*.

But to return to the question whether twenty-five grains of silver nitrate can possibly be added to one ounce of collodion. How much water ought good photographic collodion to contain which will not show crapy lines in the film? What is the extreme limit? This will settle the question, because it is the water which dissolves the silver nitrate, and not the ether and alcohol, which, when cold, are not in the slightest degree solvents of it. The extreme limit seems to be twenty minims per ounce. Now, if twelve grains of silver nitrate be used up in converting the whole of the cadmium bromide, there will remain thirteen grains to be dissolved in the twenty minims of water. Is this possible? I can only answer the question by relating what occurs in my own experience. If I take an ounce of bromised collodion, such as gives good results with the bath, and add to it silver nitrate dissolved in hot alcohol, and in such quantity as to be two or three grains only in excess of what would be sufficient to convert the whole of the cadmium bromide, this is what happens:—Adding a few drops at a time, and shaking, all goes on well until near the end, when all of a sudden the silver bromide ceases to emulsify, and sticks in clots against the side of the bottle. No amount of shaking and leaving to settle, even for days or weeks, will make it emulsify, and I am forced to add a little more bromised collodion in order to obtain a proper emulsion which will give a homogeneous film upon a glass plate.

When an emulsion thus made contains the maximum of free nitrate the excess does not, I think, amount to more than one or two grains per ounce. In that state the film is instantly reddened by the application of tannin, or a plain solution of protosulphate of iron, or an alkaline developer. Unless the free nitrate be all washed out of it it inevitably fogs. Such has been my experience; and my firm belief is that no emulsion is workable which contains any free nitrate—let those laugh who may. The test for free nitrate in a film is to plunge it into a preservative bath containing tannin. If it come out clean from this ordeal depend upon it it contained no free nitrate at all. What happens when we pour tannin solution over an imperfectly-washed bath plate? Is it not reddened at once? Then why should an emulsion film which really contains free nitrate in as large a quantity by weight as its bromide of silver *not* be reddened when it is plunged into a bath containing tannin? Possibly because the excess of silver nitrate may be not real but imaginary; or, possibly, because the tannin may have combined with the albumen, and have gone to the bottom of the bath.

There is another subject on which I have a few words to offer, and about which a great deal has been written during the last few years—I mean blurring. That there is such a thing as blurring by internal reflection at the back of the plate Major Russell has clearly proved; but I have often said, both to him and in print, that this is not the *whole* of the mystery—that there is something more, viz., what I have called a lateral transmission of actinism within the film. That this existed was first suggested to my own mind, years ago, by the following experiment:—I prepared a sensitive sheet of mica, and exposed it with the back of the sheet to the lens. On development blurring showed itself badly. Paper negatives also showed blurring where there was no internal reflection at all. I see that it is becoming now generally admitted that there is irradiation within the film itself, and the question becomes—How is this to be prevented? For important scientific purposes let it be reduced to a minimum by using daguerreotype plates; and when collodion films are used stain them with aurine.

Brittany just now is really charming, and will, no doubt, continue so until the end of October. But civilisation is encroaching year by year, and its picturesqueness is gradually passing away, so far as that depends upon what is old and odd and time-worn. What is going on here in Redon is going on elsewhere. A few years ago there was the most charming old *halle*, with black overhanging caves and carved wooden pillars; but this, which would have delighted the heart of a photographic tourist, has been pulled down and a new *halle*, which is worth nothing to him, has been erected in its place. Again: in the *grande rue* some of the queerist old houses with overhanging gables are doomed to follow suit. Amongst the *montagnes noires* they are cutting down timber by wholesale for gunpowder; and in many places they are working up old cromlechs into stone walls. "Improvement" is going on everywhere, and the artistic is being swept away. Every year brings more ugliness in place of what once charmed the eye. Come then, dear reader, to Brittany with your camera, if you ever mean to come; and come at once.

Redon, August 7, 1874. THOMAS SUTTON, B.A.

PHOTOGRAPHY IN ST. LOUIS.—INFLUENCE OF THE AMERICAN NATIONAL PHOTOGRAPHIC ASSOCIATION.—AMERICAN ENERGY AND ENTERPRISE.

ALLOW me to present my compliments with the enclosed specimens of a few stereo. views, taken occasionally during my perambulations in the wilds—as the great West is considered by many outsiders. You must not expect to find a description of a prairie on fire, a buffalo hunt, or Wild Bill tomahawking the great Jibbenainosay of the plains, but some few points that may interest your readers during their leisure moments.

Photography is with me a second nature, having worked steadily at it from its infancy till now, when it has grown to nearly full manhood; that is, since 1841—a long period, you may think, and so do I. Still I am not an "old fogey." Look at my portrait, and then I dare you to say so.

I will not encumber this short epistle with any formula or certain process. No doubt you are nearly bored to death with such; for there is so much repetition in the formulæ nowadays that one would seem to be losing valuable time in reading them. But if this communication be received with the smallest favour I will inflict upon you and your readers an article on any subject you may desire, or to which I may take a fancy, if you only give me the hint.

I am glad to see by your interesting Journal (I really do not believe you were aware I was a subscriber to THE BRITISH JOURNAL OF PHOTOGRAPHY, but I have subscribed for it for years through the good old house of E. and H. T. Anthony and Co., of New York,) that photography has the able writers indicated by the large number of names of faithful disciples of the immortal Daguerre who contribute to its pages.

Photography is wide-awake and lively in this little city of four hundred and fifty thousand inhabitants. We number thirty-five galleries of all classes. Some confine themselves to large work—such as oils, indian ink, crayon, and pastel; others to sizes not larger than 10 × 12 in water colours. With us porcelain pictures have gone out of fashion; but the popular sizes are the imperials and *carte* size. The Rembrandt style is the most popular with us. The price for imperials is ten dollars per dozen (nearly two pounds ten shillings) for best cards; plain, five dollars (one pound five shillings) per dozen; but some take them as low as three dollars per dozen. Gems and ferrotypes come in for a large share of patronage, being very popular with the masses. Prices, indeed, are very good in this city—better, I think, than in the average of the cities in the Union.

I have had my stationary gallery here for nearly twenty-eight years, and have seen the city, as well as photography, rise. My establishment is the oldest in the city. I was the first to take pictures on paper; had a visit from Archer when he was in this country; and I first introduced collodion to the American world.

The cheap-picture men flourish here as well as in all large cities. You can get any quantity or quality for one dollar—enough to supply one generation at least. We have artists who turn their whole attention to taking views, which pays well.

The wet process is brought very nearly to perfection with us, and no one thinks of trying the dry or moist process. Photography has advanced to great perfection since the inauguration of the National Photographic Association, which meets yearly. I wish some of your principal photographers would take a trip across the ocean and attend some of these yearly gatherings. I can assure you they would be heartily welcome. We have seen their work, and have admired it much; now we would like to see the artists themselves, compare notes, and have a good time generally.

I must now draw this brief communication to a close; but, before doing so, I will tell you a secret. Maybe—perhaps I may say I shall—drop in some day and be introduced to some of the greater lights of the other hemisphere, with whom I have so often communed in your Journal, and yourselves will not be forgotten;* for I have for several years thought seriously, over and over again, of going first to the "world's fair" in London, then to Paris, and lastly to Venice. For the present, however, I have been unable to find time to pay this long-desired visit to Europe. A great fault with us in this country is that we hardly find time to eat and sleep. We are—so the world says—such go-ahead folk that we have no time for any one thing; but—as I said there is a but—I intend to find time, and leave cares, troubles, and photography aside and behind for a short space of time, and take the long-wished-for trip, upon which my heart has so long been set, to see the land of my forefathers—Merry Old England. J. H. FITZGIBBON.

116, *N. Fourth-street, St. Louis, Mo., U.S., July* 20, 1874.

MR. GULLIVER'S CAMERA.

To the EDITORS.

GENTLEMEN,—In my article in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1873 I think I should have stated that a special focussing-cloth was necessary to use with the dark slides for dry plates. Such a focussing-cloth was first recommended by the firm of Bland and Long, Fleet-street, London. It is made by sewing together four pieces of black velvet lined with black calico, and made just large enough to fit easily over the end of the camera, being kept tight on by an elastic band. This form of focussing-cloth has another advantage, viz., that of being very convenient when focussing during the prevalence of wind.

My camera has a beading round the end which keeps the focussing-cloth from slipping off. After focussing the hand is passed up the cloth to the bend of the elbow, the lid of the slide is pulled up, and the elastic loop is looped over the brass pin in the end of the camera. The exposure being completed, the hand is again passed up the sleeve-like focussing-cloth, the loop is unfastened, and the slide shut down and withdrawn from the camera. With ordinary care there is no risk of light reaching the prepared plate.

I have in hand another form of dark slide for wet plates, which I expect will materially assist in getting natural clouds and distance by a gradual exposure from foreground to sky and back again. If it should prove a success I will describe it.

I may mention, in reply to the suggestion of your correspondent, that I have unmounted local views in stock, and so also have my agents, and we find it an advantage to print the views on thick paper, so that they may better stand rolling.—I am, yours, &c., THOS. GULLIVER.

7, *Nelson-street, Swansea, August* 10, 1874.

REDUCTION OF RESIDUES.

To the EDITORS.

GENTLEMEN,—Will you allow me to ask the "Peripatetic Photographer" how he obtains *sufficient* heat to fully reduce his residues?

I would not give him so much trouble, but, as "a little learning is a dangerous thing," I should not care to attempt the reduction of my residues with the little information he has given; for I am fully aware that if sufficient heat be not applied to *fully* reduce the residues they will not give so good a return as we get from the professional refiner.

Apologising for again troubling you,—I am, yours, &c.,

Pontypridd, August 10, 1874. THOS. FORREST.

ALLEGED FRAUDS BY A PHOTOGRAPHER.—Charles Bloomfield, *alias* Deptford, *alias* Mr. Leech, *alias* Mr. Williams, &c., a travelling photographer, was brought up on the 10th inst., under remand, before Mr. W. L. Evans, at the police court, Prescot, Lancashire, and committed for trial at the next Kirkdale quarter sessions, on two charges of obtaining, early in June last, money under false pretences—the first, the sum of £2 15s., from the Rev. M. Barton, vicar of Rainhill; the second, the sum of 21s., from Mrs. Draper, of Prescot. His mode of operation has been to call on persons occupying good houses, such as vicarages, &c., and asking permission to take a photograph of the building—which, being granted, and a negative produced, generally ended in his obtaining sums of money under the pretence of forwarding a given number of copies to be produced in a specified time; but which, in every case cited, he has failed to do, giving at the same time a false name and address. He was apprehended under a warrant, in Rhyl, on the 1st inst., where he was carrying on the same trade in the name of "Mr. Williams." Since he has been in custody Mr. Fowler, the superintendent of police at Prescot, has received numerous letters from gentlemen residing in the neighbourhood of Liverpool, who had been favoured with his presence, and whom he had succeeded in relieving of various amounts under similar circumstances. He is also wanted by the police authorities in Cheshire, where he has been carrying on a similar fraud.

* We shall be delighted to see our correspondent.—EDS.

EXCHANGE COLUMN.

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

Landscape negatives on $7\frac{1}{2} \times 4\frac{1}{2}$ plates, or stereos. on same size, will be given in exchange for a Howard's tent. Number of negatives to be arranged.—Address, G., Vine Cottage, Torquay.

For exchange, a new side slip and very pretty scenic background, both by Marion, for a camera and lenses for taking twelve pictures on half plate. Difference in price adjusted.—Address, FRENCHMAN, care of Mr. Greenwood, 82, Castle-street, Liverpool.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

William Hanson, Leeds.—*Portrait of the Rev. John Gott, D.D.*

James Duncalf, Birkenhead.—*View of the Burning of the Liverpool Landing Stage.*

Thomas Johnson, Leicester.—*Photograph of Ceremony of Laying Memorial Stone of Municipal Buildings, and Photograph of an Illuminated Scroll deposited in Memorial Stone.*

A. Wilkinson, Sunderland.—*Two Views of Sunderland Bridge; View of General Havelock's Monument; View in High Street, Bishop Wearmouth; and Bishopwearmouth Church.*

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

W. E. BATHO.—Received. In our next.

E. C. P.—Thanks. We shall write to the address given.

B. E. J.—Filter the solution of tannin. No other treatment will be required.

W.—If the *carte* enclosed be a fair specimen of your work it is very creditable, especially when your short experience is taken into consideration.

GEO. STARKIE.—The presence of a little gelatine is useful in the developer, even on account of the physical properties it confers upon the solution.

J. S. (Durham).—The Blair-Adams process, when used with a strong alkaline developer, will certainly prove to be much more rapid than the wet collodion process as employed by you.

ALPHA.—We agree with you; but you must get a skilled photographer to give you a few lessons in the practice of the art, as your present knowledge is decidedly more of a theoretical than practical character.

REV. J. D. R.—We expect to have an opportunity, in the course of a few days, of laying your difficulty before a friend who is thoroughly experienced in that process, after which we shall communicate with you privately.

BOZ.—We tried the sample of collodion you sent, and found that, although quite free from reticulation, it was exceedingly slow. There is no speciality in connection with it, however, to induce us to be very desirous of ascertaining how it has been prepared.

DANIEL HEDGES.—We shall obtain and forward the catalogue at the earliest opportunity. The account of the Bengal exhibition published by us was supplied from India. It is to be regretted that, obviously from some mistake, your name was omitted from the list of those who where so fortunate as to receive prizes.

V. FALCONER.—Immerse the web of cloth in a solution composed of two parts of acetate of lead to one part of water. Allow it to become dry, and then immerse it in a solution of bichromate of potash of the strength of an ounce and a-half to a quart of water. This is the way in which some of the non-actinic cloth of commerce is prepared.

A TROUBLESOME READER.—If you mix together a solution of a hundred and forty parts of protosulphate of iron and a hundred and ninety parts of acetate of lead you will obtain such a solution of nitrate of iron as will answer the purpose. You must, of course, filter the solution. Nitrate of iron and sulphate of lead (which is insoluble in water) are the results of the decomposition.

T. G. A.—This correspondent writes as follows:—"A friend has asked me to inquire if any photographs are in existence of the interior of Australia. I have not been able to meet with such up to this moment; and I shall feel extremely obliged if you can point out where I could obtain such photographs."——Perhaps some of our correspondents can supply the information required.

HAL.—There are so many processes for producing photographic engravings, or rather engravings by means of photography, we can scarcely advise you to try any one as being much superior to any other. We have not time to give you in this column the plain and easy directions for producing printing surfaces by means of photography which you require; but there are several persons in London from whom you can receive a course of practical instructions.

T. CLIXBY.—The process for printing on silk, long ago recommended by Mr. Henry Cooper, is to pour twenty ounces of boiling water on a hundred grains of chloride of ammonium and sixty grains of Iceland moss. When nearly cold filter, and immerse the silk for about a quarter of an hour. To sensitise, immerse in a rather acid twenty-grain silver solution for the same time as above mentioned. Slightly over-print, wash, and transfer to an acetate toning bath. Fix in the usual way.

C. W. HODSON (Rajpootana).—The only reliable work on carbon printing is the *Autotype Manual* published by Spencer, Sawyer, Bird, and Co. You are quite correct in surmising that the sensitised tissue would be worthless long before you could receive it; but you may not be aware that the carbon tissue is sold in an unsensitised state, in which condition it will keep for an indefinite period. It is sensitised by immersion for about half-a-minute in a solution (nearly saturated) of bichromate of potash.

CLERICUS.—We are quite at a loss to understand how, with the intervention of a film of india-rubber, the negative film could have been attacked by the collodion. Pending the arrival at a satisfactory solution of this difficulty repeat the experiment, substituting gum water for the rubber solution. Our correspondent adds:—"While my pen is in my hand let me bear testimony to the most valuable keeping properties of the paper as prepared by the formula at page 107 of your ALMANAC for the present year. I was not fortunate in toning, or, rather, in attempting to tone, with the usual bath of gold and acetate of soda; but I succeeded very well with the carbonate of soda bath and gold."——The formula referred to is that given by Mr. H. T. Anthony in his interesting article in our last ALMANAC.

H. S.—The experiment is without value, so far as our opinion is concerned, unless you apprise us of the circumstances under which it was conducted. Your "instantaneous exposure" may really mean nothing, for two reasons:—First, many photographers apply this term to an exposure which is so far from being instantaneous as to last over two seconds. Secondly, a rapid, not to say an instantaneous, exposure conveys to us no idea of the rapidity of the process employed, unless we know something about the lens; for, as you may well imagine, an exposure of a second when using a rapid portrait combination without a diaphragm is a very different thing from the same exposure with a landscape lens having a small stop. Although the duration of the time of exposure may be identical in both cases, the virtual exposure in one may be forty times greater than that in the other.

J. P. (Glasgow).—Our correspondent says:—"I lately tried some experiments with collodio-albumen plates modified thus:—1. Substratum, as usual, of dilute albumen; bromo-iodised collodion; usual nitrate bath, bromo-iodised albumen, *plunged in tray of boiling water*. When dry, excited in usual aceto-nitrate bath. 2. Same as No. 1, but used *plain* collodion, and therefore *only* the aceto-nitrate bath. All the usual washings are understood. I expected fine pictures, judging by what you say of the 'hot water' modification. I got perfect freedom from blisters, but, at the same time, with total absence of any trace of a picture. I am accustomed to work the collodio-albumen process and to get good results; but on these plates, with full exposure, no developer had any effect—the plates continuing clear and beautiful after lengthened attempts at development. Can you explain the cause? There was no change, except plunging the albumenised plate into hot water, and the use of a little aurine in the collodion."——To explain the cause of the failure is by no means difficult. By the immersion of the iodised albumen plate in hot water the whole of the iodide and bromide was dissolved out; hence, when the plate was afterwards immersed in the silver bath, no sensitive layer could be possibly be formed. To have conducted the experiment in a manner strictly analogous to the "hot water process," there ought to have been no haloid salts at all in the albumen; and the after-immersion in the silver bath should have been dispensed with. The hot water process consists in collodionising and sensitising a plate in the usual way, removing the nitrate by washing in plain water, coating with diluted albumen, and then immersing for about half-a-minute in a vessel of hot water so as to ensure the coagulation of the albumen. The plate, when dry, is ready for exposure.

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

METEOROLOGICAL REPORT,

For two Weeks ending August 12, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
30	30·03	W	58	64	75	51	Fine
August.							
1	30·02	W	60	62	72	56	Dull
3	29·92	W	54	57	72	51	Fine
4	30·08	W	55	58	63	50	Dull
5	29·93	W	54	57	—	48	Dull
6	29·93	NW	54	60	75	52	Cloudy
7	29·95	W	59	62	71	52	Dull
8	29·64	W	58	62	71	53	Cloudy
10	29·69	W	58	62	70	53	Cloudy
11	29·79	W	55	58	69	48	Cloudy
12	29·83	NW	52	55	—	46	Cloudy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 746. Vol. XXI.—AUGUST 21, 1874.

THE INFLUENCE OF COLD UPON SENSITIVE PLATES.

The inspection of a fine collection of photographs of Canadian scenery, taken by Mr. A. Henderson, the eminent landscapist, of Montreal, who is at present on a visit to this country, has suggested the propriety of collating some notes on experiments we have been recently making in connection with the effect produced by subjecting dry plates to extremely hot and cold temperatures, both before and after exposure.

In the earlier days of the art it was believed by many that heat, in some way or other, conduced to an exalted degree of sensitiveness; and in one not very old book on our shelves we find a recommendation to place a heated iron behind the sensitive plate while in the camera, in order to lessen the time of exposure requisite. But, on the other hand, we have heard numerous statements relative to the sensitiveness of plates having been so influenced by cold as to render necessary an exposure surpassing by many degrees that required under ordinary circumstances. In order to ascertain to what extent or in what degree cold influenced the sensitiveness of dry plates we have undertaken a number of experiments, using for the purpose plates of recognised commercial excellence, and temperatures considerably lower than anything represented by thermometric depression in this country.

In order that the experiment should be carried out as completely as possible we tried plates procured from various manufacturers, these being the productions respectively of the Uranium Dry-Plate Company, the Liverpool Dry-Plate Company, and Messrs. W. W. Rouch and Co., together with some we had made ourselves. The three first mentioned were emulsion plates; the last was a plate prepared by a bath process. Here, then, were thoroughly representative *matériel.*

The points we particularly desired to solve were the following questions:—First: Is the sensitiveness of plates influenced by an exposure to an extreme degree of cold between their preparation and exposure? Secondly: Is the latent or impressed image on a plate affected by cold? Thirdly: Is the susceptibility of the plate to actinic influence affected by cold during exposure?

In order to answer these questions thoroughly we had constructed a thin plate-holder or, rather, dipping-bath made of tin. In this vessel we placed the plate to be tested, and this tin plate-holder, with its plate, we placed in a vertical bath capable of holding a freezing mixture. There are many freezing mixtures in use at present; after due deliberation we at first selected one whose mode of preparation is known to, and adopted by, the majority of the manufacturers of ice-creams in the kingdom, viz., the admixture of pounded ice with common salt. It may not, perhaps, be generally known that if two parts of pounded ice be mixed with one part of common salt (chloride of sodium) a degree of cold is produced which is equal to 5° below zero. The addition of chloride of ammonium (sal ammoniac) to this mixture, in the proportion of one of the latter salt to two of the sodium and five of the ice, lowers the temperature to 12° below zero. But as we were aware that in Canada a much lower degree of temperature than this is frequently experienced by photographers (we have before us a picture by Mr. Henderson, of Montreal, taken at a temperature 20° below zero), we afterwards selected a frigorific mixture of greater intensity than the foregoing. By using the following mixture, compounded in a mortar, we secured a reduction of temperature to the extent of five degrees below even that in which Mr. Henderson's picture was obtained, and, we think, *many* degrees colder than we are likely to experience in our more temperate climate. We give the formula below, by which an intensity of cold equal to twenty-five degrees below zero can be readily produced:—

Crushed ice	12 parts.
Chloride of sodium	5 „
Nitrate of ammonia	5 „

By this admixture may be produced cold of the intensity above stated; and as ice is now to be obtained in almost every large town at a small expenditure a freezing mixture similar to that given above may be employed with much effect, and at a trivial outlay, in conducting experiments contingent upon temperature.

Such a mixture was put into a wooden shell, in which was placed the tin vessel containing the plate or plates on which our experiments were conducted.

The result may be summed up in very few words indeed. Temperature has no effect whatever upon the sensitivenes of a plate either before or after exposure. In order to furnish proof of this we divided a sensitive plate into two portions, and subjected one half to the low temperature already mentioned, that of the other half not being allowed to fall below the average temperature of 65° then prevailing. Both were exposed at the same time and developed under precisely similar conditions, no difference whatever being discovered between the two portions of the plate. Again: one plate of a pair which had been exposed was subjected to a low temperature *after* exposure, with similar results. And not only with plates of one kind were the trials made, but in each experiment four kinds of plates were represented, entailing a considerable amount of trouble and several hours' labour to determine an apparently simple matter. Everything was done in quadruplicate.

The converse of this tentative method was also essayed; that is to say, we tried a systematic course of experiments to ascertain whether or not a sensitised plate, once sensitive, would have its delicacy impaired by exposure to a high temperature. At first, however, we were almost inclined to smile at such a ringing of the changes; for we were reminded of the numerous excellent negatives we had taken by the "hot water process" of Dr. Ryley, in which one specific item of the preparation consisted in a final immersion of the sensitised plates in *boiling* water (212° Fah.). We tried, however, the effect of subjecting the plate to heat after exposure, and did not find the latent image affected even in the smallest degree.

It must not be understood from what has been written that we ignore the effect of temperature on chemical action; for in effect we are aware, and when the subject required it have always spoken, of the energetic influence exercised by a hot developer in the case of a tardy plate. The two things here referred to are, however, very different.

DIALYSIS AS APPLIED TO PHOTOGRAPHY.

The present article is supplementary to one given in our number for January 2nd of the present year, entitled *What is a Dialyser, and*

What is Its Use in Photography? for, as the terms "dialysis" and "dialyser" are now frequently met with in photographic writings, we consider it well to again devote a small space of our Journal to the consideration of this subject.

The process of dialysis was devised by Graham to separate a colloid and crystalloid—the two great divisions into which he divided all substances. Of course it is not our intention to convey the idea that the whole of the chemical molecules have a hard and fast line of demarcation dividing them. There are no such sharp lines in nature, and we invariably find that one class insensibly resolves itself, as it were, into the other. Still we find that a substance, A, may be a crystalloid, whilst a substance, B, may be a strongly-marked colloid. Strychnine and nitrate of potassium may be cited as specimens of crystalloids from the inorganic and organic world; whilst gum, gelatine, and alumina may be given as illustrations of the colloid group.

If we submit any chemical substance to the action of a porous septum, most soluble substances diffuse through such diaphragms, but at unequal rates; and this rate in the case of very strongly-marked colloids practically amounts to *nil*. We thus find that a porous septum becomes a method by which we can separate with great facility a crystalline substance from colloids. For instance: a mixture of nitrate of silver and gelatine if placed upon a septum floating upon water will lose very rapidly all the nitrate of silver, which passes through the porous material, and leaves the colloid gelatine upon the septum. Thus we find that this septum becomes actually an instrument of analysis, and will perform a process of separation between any two substances that are sufficiently distinct as regards their relative rates of diffusion.

The best, or one of the best, septums that can practically be used is the ordinary parchment paper, which is itself a colloid substance. Paper is, of course, merely cotton fibre, and if we submit such fibres, either in the form of paper or of cotton wool, to the action of nitric and sulphuric acid we find that it assimilates the elements of nitrous oxide and forms pyroxyline. We also find that the fibres or tubes of the cotton plant have, in undergoing this process, shrunk, and the result is that, if we have been operating upon thin paper, we shall find the paper covered with a number of minute holes from the contraction of the fibre. If, however, we leave out the nitric, and use sulphuric, acid, of course no gun-cotton is formed; but the action of the sulphuric acid results in the swelling of the fibres, the thickening of the paper, and its conversion into an insoluble, jelly-like substance, perfectly colloid in its nature, and which, when dry, presents the horny character peculiar to a dry colloid. It is this fact—that is to say, the conversion of it into the colloid—which makes such a piece of paper act as a dialyser. Colloids, even in solution, will not pass through colloids, but the crystalline substance will.

Thus as each particle of salt passes through the septum it should be carried off by a gentle stream of water; at least this is the most efficacious manner of dialysing quickly, if it be the colloid that is wanted, and if it is not necessary to preserve the salt. As an example, therefore, in the production of an emulsion, and its purification from the salts by dialysis, we have in the dialyser bromide and iodide of silver nearly insoluble, gelatine which will not pass through the septum because of its colloid character, and nitrate of potassium which rapidly diffuses through the septum from its very well-marked crystalline character.

But it will be seen at once that films of gelatine will act as their own septum; in other words, that it is only necessary to place such pieces of gelatine in running water when the actual solution of the gelatine is next to nothing; it itself acts as its own septum, and the dialysis of the salts proceeds through the substance of the gelatine, the outer layer of which acts as a septum.

We thus see that, without much difficulty, these laws of dialysis may be applied with very useful results to the photographic art. At the same time it must be borne in mind that the action of a colloid septum is quite distinct from that of a filter, which only separates mechanical impurities; whilst parchment paper, or any substance like it, has a selective power which extends to most soluble substances.

A WORD IN SEASON ABOUT LENSES.

There is, perhaps, nothing in connection with photography about which we receive more communications than the photographic lens, and about which there are in general such hazy ideas. The great bulk of the profession know very well when they get a satisfactory lens, and they also believe, and with much truth, that the instruments manufactured by our English opticians are, to put it mildly, equal to those produced in any part of the world; but, judging from the nature and number of the queries we receive, we are warranted in saying there are many who hardly recognise the great necessity that exists for care in keeping such a lens up to its normally perfect condition. Our readers, generally, know that in the calculations necessary to ascertain the curves required for the production of any particular effect the density of the glass is an important element; but we doubt very much whether, as a rule, they are aware how very easily that density may be either temporarily or permanently modified to such an extent as to interfere very materially with the proper performance of the lens.

We had occasion, recently, to notice a variety of glass, as fine and flexible as cotton wool, which was very suitable for filtering purposes, and it is well known that it can be spun into a substance capable of being plaited and curled like hair; but, when photographers think of such glass as their lenses are made of, it is as a rigid, intractable substance much more ready to break than to bend. Those, however, who are acquainted with the polarisation of light, or who have seen it passed through a plate of glass which had been slightly pressed by the turn of a screw, know that what was before a homogeneous piece of glass is instantly transformed into something so irregular in its structure as to give those most beautiful bands of colour so attractive as a lecture experiment.

Now, what occurs in the compress apparatus takes place, though in a somewhat less degree, in a photographic lens. Whenever it is unequally pressed upon by any portion of the mount the lens becomes unequal in density, and the result is a deterioration in the quality of the transmitted image. This unequal pressure of the mount may be brought about in various ways; but it is more than likely that in nearly every case it is caused by a fall or a knock by some hard substance, which has the effect of permanently changing the lens, or, rather, the quality of its work.

There is another fault of which we occasionally hear, and which, although its existence is sometimes doubted, may perhaps be traced to the same cause. It is that, although the lens works well enough for the greater part of the day, there are occasionally some hours in which its performance is unsatisfactory. If such a lens be examined it will probably be found to be too tight in its cell, and the defect, no doubt, arises from the greater expansion of the glass, consequent on the rising temperature and the unequal pressure thus produced. In this case, as in most others when the cause is ascertained, the remedy is obvious—remove the pressure caused by the indentation, and, if necessary, have the lens slightly slackened in its cell. This, of course, can be best done by a practical optician, and especially by the maker of the particular lens, whose interest is always involved in the satisfactory working of his productions.

ACIDS IN THE DEVELOPER.

Making use of a bath surcharged with ether and alcohol from the frequent dipping of plates, the following results were obtained as indications of the action of acetic acid in the developer:—The plates used were cut in two, the halves exposed in immediate succession to the same collection of objects for equal times, and developed separately, as in the case of the experiments recorded by me at page 386.

Of the first plate one half was developed with—

Iron protosulphate	1 drachm.
Water	4 ounces.

The solution had, as before, a slightly-acid reaction. The other half of the plate was brought out with one ounce of the above solution *plus* half a drachm of Beaufoy's acetic acid. Result: a little more detail and a little more density on the half developed with the acid solution. The development was also somewhat retarded.

The first half of the second plate was developed with the same iron solution as before, and the second half with one ounce of the same iron *plus* one drachm of the acetic acid. Result: a little more density and a little more detail on the acid-developed side, with retardation of development.

The first half of the third plate was treated with the plain iron solution as before *plus* a quarter of its bulk of alcohol as before, and the second half with one ounce of plain iron *plus* two drachms of the acetic acid. Result: on the acid side same density, more detail, and prolonged development. This formed the last experiment with the surcharged bath.

The unacidified developer was in each instance applied to the thick end of the film—a circumstance giving a bias of intensity in its favour; and yet the density in two instances out of the three was on the opposite side, and in the third instance it was equal on both sides of the plate, which again implies a slight advantage on the half developed with the acid.

These results at first sight seem to confirm the idea generally entertained that acids in the developer confer local intensity whilst they restrain. The amount of ether and alcohol in the bath solution, however, was so large that in the instances of development with unacidified and unalcoholised iron the flow of the developer was extremely bad, and its adhesion to the plate unsatisfactory in the extreme—a circumstance which, in view of the experiments previously recorded by me, sufficiently explains the difference in the results obtained. In the instance of the third plate the side developed with unacidified but alcoholised iron exhibited no want of density, but a little want of detail. The adhesion of the alcoholised developer was more perfect than the plain iron, but less so than that strongly acidified, to which circumstance I think we should attribute both the difference effected and the difference still uneffected. In short, the experiments here placed on record corroborate those recorded before, in the view that acids do not increase density or detail from any property they possess as such, but where they do it at all they do so only from their incidental property of causing adhesion to the plate; at anyrate, these deductions seem to hold good in photography by the wet collodion process.

The total absence of fog in each instance of the two series of experiments I have detailed, where the plates were developed with iron not purposely acidified, certainly afford evidence that the intentional acidification, if ever, is not always necessary as a preventive of the abnormal deposit fog. Both series also show, to my thinking, that where aggregation of intensity follows acidified development in the wet collodion process it does so from a property possessed by acids which is not acidity; whilst, finally, the retardations which acids give, and which become desirable to photographers who can afford to indulge in over-exposure, can, as is already well-known and as I shall hereafter again point out, be obtained by other means whose employment is, to my thinking, attended with fewer objections.

D. Winstanley.

THE LATENT IMAGE.

In the concluding article of the series on this important subject we have now to discuss the effect of organic matter in the film; and the following very simple experiment—which I have repeated many times—will convince us of the impossibility of obtaining a developable latent image without its presence. This having been established, we shall have to return to the formulæ given at the end of my preceding article on this subject, and see in what manner the introduction of organic matter, which is strong in its reaction with silver salts, affects those formulæ, which, I may here observe, were only a first step towards arriving at the truth.

The experiment to which I refer above is this:—Prepare, by means of bromised collodion and a strong nitrate bath, a sensitive film of bromide of silver upon a glass plate; and wash this thoroughly in several changes of water. Let us suppose the plate to be a stereoscopic one. Now coat one half of the plate with some diluted albumen, in the proportion of one part of albumen to three parts of water; and, taking care that this does not spread over the other half of the plate, expose it in a binocular camera, giving both halves the same exposure to the same subject. Develope immediately afterwards by the alkaline method. The result will be very remarkable and instructive. That half of the plate upon which there was no albumen will at once begin to develope, and an image will be very quickly brought out upon it, sometimes even before a trace has appeared on the other half of the plate; but this image will soon become fogged and worthless. Meantime the albumenised part of the plate will progress slowly and favourably, and by the usual treatment will, eventually, yield a good negative.

In the above experiments I am supposing, of course, a horny collodion to be used, which is comparatively inert in its reaction with silver salts, and not a porous collodion, which may be strong in its reaction with them; for with such a collodion it may be quite possible to obtain a fair result without the application of any kind of preservative. This, however, is a rare occurrence, and such a collodion is not often met with in practice. It appears to me, therefore, that the action of organic matter in the film is not merely mechanical, but *chemical*. It seems to me that it does something more than merely restrain the action of the developer; because unconverted bromide will do that, although it will not enable the film to give a developable latent image without active organic matter.

Let us, then, carefully consider this new mystery. My explanation of it—which is consistent with all the facts—is simple enough, and is as follows:—When bromide of silver is exposed to light, in contact with water, but *without* the presence of organic matter, a dark grey sub-bromide of silver is formed, which is not readily affected by nitric acid; and at the same time, by the continued action of light, oxygen is set free.

The change may be shown by the following formula:—

$$3\,Ag\,Br + H_2O = Ag_3\,Br + 2\,HBr + O.$$

Three atoms of silver bromide, *plus* an atom of water, equal an atom of sub-bromide of silver, *plus* two atoms of hydrobromic acid, *plus* an atom of oxygen.

The latent image upon the non-albumenised half of our plate in the experiment under consideration, and upon which light may not have acted sufficiently long to expel the atom of oxygen, will therefore be, as I showed in my former article, an oxybromide of silver, composed of $Ag\,Br,\ Ag_2O$. But it appears that this image will not bear development, because it is almost as easily reduced as the unexposed bromide of silver. Why is this? And why does the presence of organic matter render the image developable by keeping bright the unexposed parts of the picture?

The reply appears to me to be this:—The organic matter certainly restrains the action of the developer upon the unexposed bromide of silver. It acts, no doubt, as a temporary protection to that. But why does it not act equally as a protection to the latent image? Here is my answer to that important query:—The latent image will now be composed of $Ag\,Br,\ Ag_2O,\ M$ (M being the symbol for organic matter). But organic matter, which is strong in its reaction with silver salts, has a strong affinity for oxide of silver; therefore the M, which ought to have protected the Ag Br from reduction, has left it to combine with the oxide of silver, Ag_2O. The unprotected Ag Br in the latent image is, therefore, reduced by the alkaline developer, and gives the first indication of the visible image; at the same time that the Ag_2O, M, being now separated from the Ag Br, takes its own natural dark colour, and adds to the intensity of the image.

Let me explain my meaning, if possible, more clearly. The latent image $Ag\,Br,\ Ag_2O$, M—that is to say, organic oxybromide of silver—is, I imagine, of a pale yellow colour, and invisible in the dark room; but, when the Ag Br part of it has been reduced to Ag, the compound assumes a dark colour.

Now, let us go a step further. The latent image having been reduced to the visible one represented by Ag *plus* Ag_2O, M, the continued action of our alkaline developer, which is a powerful reducing agent, removes the oxygen, O, from the above, and leaves simply three atoms of metallic silver *plus* organic matter. This gives us the greatest intensity which can be obtained.

In support of my view of the above chemical reactions taking place we all know what a ticklish matter alkaline development is, and how very easy it is, by adding too much ammonia to our developer, to reduce not only the exposed but also the *un*exposed bromide of silver, and thereby fog the negative beyond all hope of redemption. I have only to add that I have proved a hundred times that the white bromide of silver and the dark grey sub-bromide of silver are reduced with almost equal facility by the same alkaline developer; so that from this fact it seems impossible that the latent image should be composed of sub-bromide—as Captain Abney has supposed.

The evidence against his supposition may, therefore, be summed up thus:—

1. Sub-bromide of silver is a dark grey substance; the image would, therefore, not be latent, but visible.

2. Sub-bromide of silver is not readily acted on by nitric acid; but the latent image is readily effaced by that acid.

3. The same alkaline developer will reduce with almost equal facility the bromide and the sub-bromide of silver.

It appears, therefore, to be far more probable that the latent image is composed of organic oxybromide of silver, which may be a pale yellowish substance, undistinguishable in the dim light of the operating room from white bromide of silver, than that it should be composed of dark grey sub-bromide of silver—a compound which we know to possess properties that the latent image has not.

And here I may mention a curious fact in connection with grey sub-bromide of silver:—I once converted a negative upon a bromide film into a positive by the nitric acid treatment, and put it into a window exposed to the light for several weeks. The result was that it at first turned grey or blue, and then gradually lost its intensity by transmitted light, until at last it seemed to become little more than a very pale stain upon the glass. Are we to conclude from this that light gradually expels the atom of bromine from sub-bromide of silver, and reduces it to the metallic state? It would seem probable *a priori* that this should be the case, particularly when we reflect that the atmospheric moisture is generally contaminated with a trace of carbonate of ammonia, which would have an affinity for the atom of bromine.

It only remains to add a word or two upon the development of the image by the acid method with pyrogallic acid or protosulphate of iron and silver. It will be obvious enough, I think, that a developer of this kind in a state of decomposition will precipitate its silver upon the organic oxide of silver which the latent image contains.

In conclusion: a word or two of explanation as to how an alkaline developer reduces the latent image of organic oxybromide of silver to the metallic state may not be out of place. The developer is not merely a deoxidising agent. If it were, it would have the Ag Br portion of the latent image untouched; and I will show presently that this effect does actually occur in a particular experiment which I will describe. The developer has not only an affinity for oxygen; its alkaline metal has an affinity for bromine. The reduction of bromide of silver to the metallic state by an alkaline developer seems to be effected thus:—The alkali is decomposed, its oxygen going to the pyrogallic acid, and its metal taking the bromine from the silver.

The experiment just referred to is this:—Some sensitive collodio-bromide emulsion was poured upon a glass plate, and the film, without being washed, was exposed in the camera. The image was then developed by pouring over it a solution of plain protosulphate of iron in a mixture of equal parts of water and alcohol. On destroying the image with nitric acid it was invariably found that even in the fully-exposed sky a film of unreduced bromide of silver remained beneath. This seems to me to prove that the developer —which was merely a deoxidising agent—only reduced the organic oxide portion of the latent image, leaving the silver bromide part of it untouched.

I have now completed a series of articles which are the result of many years of thought and hundreds of experiments. I beg leave to commend them to the careful consideration of my readers, in hopes that they may find therein a rational explanation of the formation of the latent image in the camera—a subject which it is of the highest importance to us all to comprehend.

THOMAS SUTTON, B.A.

ON NITRO-GLUCOSE.

No. II.

THE practice of adding organic substances to emulsions for the purpose of conferring density, though much resorted to at the present day, is not to be recommended when a suitable pyroxyline is obtainable—that is to say, a pyroxyline yielding a collodion which, *when new*, is at once fit for use; or, in other words, an "intense cotton." Many samples of cotton are found which are entirely useless until the collodion has been kept some time, while, on the contrary, others may be used immediately. This points directly to the existence of some difference in the nature of the two classes of cotton, depending upon the varying circumstances of temperature and strength of acids employed in their manufacture.

It has been stated that in the process of making pyroxyline a certain or, probably, to speak more correctly, an *uncertain* proportion of nitro-glucose is formed simultaneously. Assuming the possibility, in the short period during which the cotton is subjected to the action of the nitro-sulphuric acid, of the conversion of a portion of the cellulose into glucose, and the subsequent conversion of the latter into nitro-glucose, the presence in uncertain proportion of a substance possessing powerful organic reactions with silver nitrate is quite sufficient to account for the variable nature of the product, both as regards density and sensitiveness.

In searching for a suitable substance by means of which the inherent properties of a particular sample of pyroxyline may be modified, it is but natural that we should be led to the one which theory points to as being correct; and thus it happens that, perhaps twenty years ago, nitro-glucose was suggested as a means of securing greater density in the then new collodion process. More recently it has been proposed to increase the sensitiveness of collodion by depriving the pyroxyline of its nitro-glucose by treatment with alcohol or boiling water. The advantages claimed for this latter mode of treatment are, to say the least, dubious, for we generally find that the more organic pyroxylines are also more sensitive for emulsion work. I have found by careful experiment that very great changes may be brought about in the nature of any sample of collodion by the addition of nitro-glucose; in fact, so great is its power that it makes us almost entirely independent of the pyroxyline maker, and puts the much-vaunted "intense cotton" within the reach of all. Like most other things it has its disadvantages; but they are not of a nature to cause its condemnation.

A solution freshly prepared varies daily in its properties for some time until the full decomposition has taken place; and the length of time required for this change depends upon the season of the year or temperature at which the solution is kept. This imports an element of uncertainty into the use of nitro-glucose, as I have found that twelve grains newly dissolved added to one ounce of emulsion produce less effect than two grains after having been in solution for four or five weeks. This uncertainty may be obviated by keeping a solution until properly "aged," and not using it until it is found that the maximum change has taken place.

Another difficulty will be found in the fact that probably no two samples of cotton require the same treatment, or even two lots of collodion made from the same cotton, but of different ages. My first experiments were made with an average strength of two grains to the ounce of emulsion; and at that time I concluded this to be about the correct point, though I could work as high as twelve grains to the ounce. I have found it necessary, however, to reduce the quantity very materially; and now that my nitro-glucose solution is about five months old one grain in four or five ounces is quite sufficient. I had anticipated that the result of an over-dose would have been the production of insensitiveness and hardness; but, on the contrary, instead of producing great density and transparent shadows, the whole surface of the plate veils over at once. It would appear as if the silver compound were so sensitive as to be unable to bear the action of alkaline development, however weak; for a plate prepared from such an emulsion, if treated with dilute nitric acid and washed thoroughly so as to dissolve out the superfluous compound, will work as well as can be desired.

My method of using the nitro-glucose solution is to add it to the collodion before bromising, and during the operation of sensitising it is imperative that, for some portion of the time, it should be subjected to the action of free silver, taking care to have bromide in excess at the finish.

A few months ago Mr. Gough called attention to some experiments of his own with nitro-glucose, described in a contribution last October. On turning to the communication in question I find that, owing to the high price of the article in question, he had substituted "*raisin syrup*" for it. If Mr. Gough would like to try the "real thing" I shall be happy to send him a sample.

W. B. BOLTON.

ON THE ACTION OF RAYS OF DIFFERENT REFRANGIBILITY ON IODIDE AND BROMIDE OF SILVER, WITH THE INFLUENCE OF COLOURING MATTERS.

THERE is considerable attention being given just now to the question whether it is possible to vary the nature of the sensitive film so as to make it amenable to influences which it refuses to heed in its normal state. It is known that not only the physical condition of the substances which are capable of receiving this impression, but also that the presence of other bodies—principally organic—has an effect on the sensitiveness of the salts of silver, causing it to vary, and also, it is asserted, to be displaced and to act with differing intensity in different parts of the spectrum.

Upon this subject M. E. Becquerel has recently presented a note to the French Academy of Sciences, and he states that iodide of silver is of all the salts the substance upon which variations of condition of this sort has most effect. If this body be prepared in a manner similar to that of Daguerre upon a surface of silver, and exposed to the action of the solar spectrum without having been previously exposed to ordinary light, it is sensitive only from the blue to the extremity of the ultra violet; that is to say, the limit of refrangibility is to be found between the line F and G, and the maximum action between G and H, but nearer to G. As M.

Becquerel pointed out in 1840, if iodide of silver have been previously exposed for ever such a brief time to ordinary light before being subjected to that of the spectrum it becomes not only sensitive within those limits, but, more than that, the sensitiveness is extended to between the red and the blue, with a second maximum of intensity situated near to D, and this, too, with a degree of intensity which depends upon the extent of the previous exposure.

At the same time this effect of the red and yellow rays takes place under such conditions that, without having recourse to the vapour of mercury, if the iodide film be examined after a sufficiently long time has elapsed for the effect produced on the iodised plate of silver, it will be found that the reduction of silver has produced a soft, white trace where the prismatic light has fallen, extending even into the red, while the same experiment under the violet and blue rays gives only a blackish trace—proof this that the silver reduced is in a different physical condition in the several parts. Hence the part which yellow and red rays may be made to play in order to produce visible images without mercury by the simple action of light.

Iodised daguerreotype plates, coated with iodide or bromide, and then, after a short exposure, submitted during a short time to the action of the spectrum become, when passed over the vapour of mercury, as is known, marked in various ways towards the red rays and even beyond them, and which indicate effects the inverse of that which the light had at first exercised. But if the exposure to the spectrum be of very long duration this effect is buried, and there is visible—whether with or without the action of the vapour of mercury—in the prismatic yellow and red, and a little beyond, only a reduction of silver of a whitish tint, different to that which the violet rays give.

Again: if iodide of silver be obtained by double precipitation, and placed on paper, or incorporated in collodion or gelatine, the effects observable are different according to the conditions of lighting under which it is exposed. Precipitated, isolated, and pure, it is almost insensitive; placed on paper, and in the presence of an excess of nitrate of silver, which comes to the help of the decomposing action of the light, it grows very sensitive, and, without employing a developer, it is capable of revealing images through prolonged action of light and after previous exposure. In such cases two maxima are shown—the one in the yellow, the other in the violet-blue. Bromide and iodide here act in the same way.

If iodide of silver be incorporated with collodion and constitutes such a surface as is habitually used in photography, and if, pre-exposed or not, it be submitted to the action of the solar spectrum when the film is wet for a very short time, it will be found that under any ordinary developing agent marks of action will not be developed beyond F and G, with a maximum of action between G and H in the same way as before. Chloride of silver behaves just the same; but bromide gives an image slightly more extended into the green. The influence of previous exposure has not been determined in the case of wet collodion in any degree sufficient to allow of definite conclusions. But if dry collodion be worked with, the same effects can only be obtained under the conditions detailed when speaking of paper-sustained surfaces, and pre-exposures never will enable an impression to be got of the least refrangible rays of the spectrum.

Turn now to the colour-loaded plates upon which Dr. Vogel has been experimenting. He has observed the curious fact that if different colouring matters be mixed with collodions the zone of sensitiveness is changed, and the surface may become, almost at will, sensitive to those rays which ordinarily are hopelessly beyond the photographer's reach. M. Becquerel asks whether this colouring matter acts by its presence in aid of the reducing power of the light, and in rendering the salts of silver sensible to the action of other rays than usual, or whether it acts more as a screen surrounding them; or, as Dr. Vogel appears to think, do the rays absorbed by this colouring matter which is mixed with the iodide become active by virtue of their absorption? If this last be the case, how, M. Becquerel asks, is this iodide of silver—this insoluble salt—acted upon by an influence totally outside itself? It is difficult at first sight to admit the possibility of this—to believe that the colouring matter adhering to the iodide makes one body with it, and transmits to it its absorptive power for the benefit of certain special tints. It must be confessed that the proposition looks incongruous enough. M. Becquerel does not here discuss it fully, however, and we shall hope to return to his remarks at a later date.

PERMANENT PRINTS.

The want of permanence in photographic prints is certainly a disadvantage the absence of which would greatly enhance their value, and he who will take warning by the signs of the times will set his "house in order" previous to the demise of silver printing.

The means to this end already at the disposal of the profession exist in the carbon process and the Woodburytype. They both give results having the beauty of silver prints or nearly so, in addition to which permanency is guaranteed in both processes. Of the carbon process it is not proposed to say anything now, the patentees of the process affording great facilities to photographers, enabling them to avail themselves of its valuable properties. In the instance of the Woodburytype, it now being the property of the public in consequence of the demise of the patent, opportunity is presented for applying it, if possible, to the production of our ordinary *carte* work. The advantages it affords as regards rapidity combined with permanence are so great as to stimulate experimentalists to try to make it applicable to the everyday needs of the professional man.

A brief *résumé* of the process may here be given. In the first place a relief in gelatine is produced from the negative, the lights and shadows of which negative are represented by depressions and elevations, the amount of which depends upon, and having relationship with, the gradations of light and shade in the original. This relief is then pressed into a metal tablet. Into the hollow of this tablet (or "intaglio," as it is technically termed) a semi-transparent ink is poured. A piece of paper is, with pressure, now applied to this tablet, and the result is a print so closely equalling one in silver as to lead many to doubt of its being otherwise, and having qualities which no alleged superiority of silver printing can counterbalance. It has the advantage, moreover, of being produced without the agency of daylight, and is independent of it in all operations subsequent to the production of the relief, in which latter operation, by the way, artificial light has been commercially employed.

With all these advantages, it may be asked—How is it that silver printing has not long since been superseded? The chief reason will be found in the expensive apparatus required to produce the intaglio. The patentee uses hydraulic pressure, the gelatine relief and the metal tablet being placed between two steel plates and subjected to a pressure of about fifty tons for the *carte* picture. The plant required is clearly such as only large capitalists can obtain. Here it is where the shoe pinches, and if ever the photo-relief process is to become applicable to the everyday wants of photographers some other means of producing the intaglios must be found. Following this path, I may say I have seen a cabinet copy of an engraving having the utmost sharpness, the intaglio of which was produced with the pressure obtained from a common rolling-press. Still I should be afraid of distortion by such expedients, and in this case no opportunities for comparison were at hand; so the only alternative left is to seek for a way to produce the mould without pressure.

Calling the attention of commercial houses to what might prove a favourable speculation is scarcely the thing to insert in the body of the Journal; but the advantages which would result to photographers if the Woodburytype Company would undertake to produce intaglios for the profession, at a small yet paying rate, would be so many as to be sufficient excuse for such a breach of propriety, the company possessing facilities for such work which the individual photographer cannot acquire.

But to return to the production of moulds without pressure. The first and most obvious method is found in electrotyping. This, however, for reasons I cannot quite comprehend, except it be in consequence of the time taken to make a suitable deposit, has not been practically employed. Probably, were such modifications made as were suggested in an article in a late number, results approaching perfection might be expected; still if equally good results can be obtained with a less expenditure of time it would be preferable.

The use of sulphur has already been suggested, and I believe Mr. Woodbury was tolerably successful with this substance. In any use that is made of it attention may be given, when melting, to the allotropic conditions of this body; still the brittle nature of the mould when finished must have many disadvantages. Mitscherlich says that various modifications of sulphur may be obtained by melting fatty matters along with it; and perhaps some of these compounds may be blessed by the absence of the brittleness attaching to sulphur. This, however, will be determined when opportunity presents itself.

A compound, on which to make prints, recommended some years ago in The British Journal of Photography might be found useful for the purpose in view. For a description of the substance I quote the words given in your sub-leader in No. 488:—"It has long been known that oxide of zinc, when made into a paste with a strong solution of the chloride of the same metal, forms a cement which sets very rapidly, and yields a hard, white concrete rivalling marble when prepared with care." Were such a paste pressed into the interstices of a relief I do not see any reason why, when the cement was set, it could not be detached and an intaglio formed having all the necessary qualities. Other substances will readily suggest themselves, amongst which may be mentioned a base such as the oxide of zinc mixed up with soluble glass and applied while in the plastic state to the relief. In fact, all the cements of Professor Böttger (of which this is one) might be so used.

I will refer to another method upon which, when opportunity persents itself, it is hoped I shall be able to supply something of a more practical nature to your readers. Those who may have had some instruction in the chemistry of the metals will be aware that a very fusible alloy can be formed with a mixture of bismuth, lead, and tin. This alloy melts at a very low temperature—so much so as to make it possible to apply it to a relief in its fused state without any danger of causing destruction of the gelatine. The fusibility of the alloy can be reduced much lower by the addition of cadmium—the former compound fusing below boiling point of water, and the latter at a temperature from 60° to 65° centigrade; therefore a sufficiently low degree of heat along with a liquid metal can be obtained. Type metal, however, is to be preferred on account of its valuable property of expanding when cooling, and when pressure is so applied as to allow of expansion only in the required direction the metal is forced into the interstices of the mould, thus ensuring a sharp image; and if the addition of antimony to either of the before-mentioned fusible alloys will confer this valuable quality without materially increasing the point of fusion, there will be no difficulty in the way of obtaining perfectly sharp moulds for relief printing without the aid of the hydraulic press. Should, however, this not be so, a way is seen to apply type metal in a fused state without the danger of destroying the gelatine relief, which, at first sight, owing to the temperature, appears inevitable. W. E. Batho.

PHOTOGRAPHIC POSITIVES PRINTED IN INK WITHOUT THE AID OF A PRESS.

The *Bulletin Belge* is responsible for the formula which we here give of a modification of carbon printing.

Operations are commenced by obtaining on a transitory support and on glass a carbon print in the ordinary way, and varnishing it with rather weak gum dammar varnish made with pure benzine. This print should be surrounded then with an edging of mastic varnish, and in the meantime the following solution prepared by the help of the sand bath:—

Gelatine	1 part,
Gum arabic	1 „
Glycerine	2 parts,

with the least possible quantity of water. This mixture is poured warm on to the carbon print after slightly heating it to prevent the glass from cracking. It should form a thick coating on the top of the image, and when sufficiently congealed the whole is detached from the glass. The mass of gelatine forming the bed of the separated print, as it were, is then placed upon any plane surface at hand, and the image is ready for being printed from. The usual law governing the action of the gelatine matrix causes the ink applied to its surface to adhere where the insoluble gelatine has retained the pigments, and to be repelled where the *soluble* gelatine still retains its moisture-absorbing properties.

When wishing to print from this image ordinary lithographers' ink, slightly thick, is taken and thinned with some olive oil or oil of turpentine—indeed, with any oil except boiled oil. A ground-glass large roller is the best to ink with, the ordinary printers' roller producing a stickiness that causes adhesion to the surface of the image and tends to tear it. The roller is covered with ink in the usual way, viz., by working it over an elastic surface, such as a bed of gelatine would be, until the ink is distributed with perfect uniformity. In almost the same manner it is applied to the image until it is sufficiently inked. If over-inked the surplusage may be removed by a moist rag.

If the ink used be too thick it will adhere only to the deep shadows, and must be thinned if half-tones are to be included. This peculiarity may be utilised either in order to give greater depth to the shadows of a picture or to obtain prints in different tints at the same time from the same plate. In the former case rollers with inks of different consistency are used, and in the latter rollers covered with different coloured inks, also of different viscosity. The plate is inked first with the thickest of these, and so on, the thinner ink refusing to overlay those first applied and which adhere to the deeper shadows, and only filling in what they leave out. Pictures on a coloured ground can thus be easily produced.

The printing is very simply done. A smooth-surfaced paper, either glazed or coated with non-coagulated albumen, is laid on the plate and pressed down on to it, either by means of an india-rubber scraper or a roller covered with flannel. The impression thus taken is carefully removed, and the printing proceeded with in the same fashion as described, only that the plate must be moistened between each impression.

The negative used should be one on which the image has been obtained through the glass in the camera, and if such a plate be not at hand the carbon print forming the matrix should be taken on stearine paper. This paper is made by placing a sheet of ordinary albumenised paper on a bath composed as follows:—

Ordinary alcohol	3½ ounces.
Stearine	3½ drachms.
Common resin	½ drachm.

Dissolve the stearine in warm alcohol and add the resin afterwards. A print developed upon this support is then re-transferred to the glass coated with gum dammar varnish.

The facility with which curved surfaces can be printed upon in this way makes it an admirable plan for printing upon vases, &c., with vitrifiable colours; and it is, in fact, a handy plan, if not for commercial photographic printing, at least for trying all kinds of experiments, and one by which amateurs might amuse themselves without much difficulty and at small cost.

ON THE NEGATIVE BATH.

I note in this week's Journal some exceedingly excellent remarks by Mr. E. Dunmore on the above subject; and, believing that a few practical suggestions are worth more than a thousand theories, I venture to throw my mite into the general stock.

But, first of all, I would state my experience. I am a wet-plate worker in the field of twenty years' standing, and yet have not been worried (if I may use the term) by the bath going wrong; indeed, I do very little to my bath after it is once made. Possibly the making of it has something to do with it. Working all the season, as I have been, out of doors, in both extremes of temperature, and always getting good results as regards cleanliness, freedom from spots, stains and markings, feeling sure that things are all right is enough to make photography a pleasure instead of a bore, as it is to some. If therefore, by describing my method, I help any poor brother "over the stile," at least I shall have done some good.

And first, as to the making of my bath. Last July twelve months I procured some distilled water from Messrs. Johnson and Co., chemists, of Liverpool, and, following Mr. Harding Warner's advice, I boiled it, added my silver, iodised it with potassium, allowed it to cool, filtered and corrected it for alkalinity, and for six months it had constant steady work, without a single mishap. All that was done was to filter it after using it in the morning before going out, now and then adding an ounce or so of a fresh thirty-grain solution.

Once I was terribly troubled with pinholes, but a close examination with the microscope showed me that they were formed of small particles of lampblack; so I sized the entire inside of my camera with a weak solution of glue, and thus "laid" the enemy for ever, as I have never been troubled since.

Poor bath! you often have to bear the blame of others' faults besides your own. After six months ether and alcohol began to tell upon it, and the aldehyde smell made it evident that something must be done, and done quickly. So emptying the bath into a china-lined saucepan it was steadily boiled for twenty minutes, allowed to cool in the sun, then ten ounces of a thirty-grain solution added to it, filtered, and corrected for alkalinity, when lo! it was again good for another two months of hard work. The hot weather set in and then it gradually began to show symptoms of being done up. Testing it with the argentometer it showed full strength. Feeling sure that its deterioration was only due to the gathering of aldehyde in excess, and being very busy and pressed for time—unable, in fact, to give it the zinc chastisement of Mr. Gough, which is an excellent cure for refractory baths—I set to work to make a new one.

This time I was far away from town. I had received and read The British Journal of Photography, and noticed the advice there given by Mr. W. E. Batho as to adding a little alcohol, so as to make the aqueous solution mix better with the etherial. I was reminded by Mr. Batho's remarks that, years ago, the same course was recommended by Ponting, of Bristol, and Perry, of Sheffield, which thus proves that in the new idea started there is nothing new. I naturally supposed that my new bath would be better, and last longer than the old one; but in this I was disappointed. The addition of the alcohol was not satisfactory. It had the desired effect at first, and the bath got sooner into work; but it did not give such even pictures. It required more filtering, and it sooner went wrong after a hard day's work. At last I was forced to the conclusion that a bath made on the old plan without the alcohol was far better. Now I am using such, and have no trouble with it. It never needs acid added after the first correction; it only requires what I have said—filtration and a little fresh solution.

At the end of the season I shall hope to recover my first bath by Mr. Gough's mode of treatment, which is alike simple and effectual.

An Old Hand.

M. LEON VIDAL'S COMPLAINT.

The indefatigable Marseilles photographer considers that he has a just grievance against his brethren, and against those who speak and write upon subjects photographic in particular. He has waited hoping that somebody would wake the profession up upon the point; but as nobody has done so he is compelled to take pen in hand himself. It has pained him to find that few or none took any notice of his heliochromic process in the late French exhibition. Except by the editor of the *Moniteur*, it has been almost utterly passed over. The very reporter of the jury sinned in this respect most grievously, for although he signalises in an unique manner the deeds of M. Roussillon, he passed over all efforts at heliochromy in silence. Most of all is he angry at the way in which his process has been characterised in giving the reasons why a medal was awarded to him.

In the first place, the report treats him as if he were the only one who had ever been mad enough to try such experiments; and, in the next place, it calls his samples "very curious specimens." This is a sore matter, and an injustice to the art; nay, to the *science* of photographic colour printing, M. Vidal thinks. It is not as mere curiosities that he exhibited his specimens, but as the tokens of a new enlargement of the scope of photography. By means of this process so cavalierly dismissed he sees the future filled with many new adaptations of the art; it is to form the basis of a vast industry to replace chromo-lithography—the latter being incapable of struggling long against it.

Entertaining views like these it is natural that he should object—that he should protest—against the neglect with which his art has been treated. And it would be an utter mistake to suppose that M. Vidal does this merely from selfish grounds or from vanity; for such is not the case. His enthusiasm may be mistaken, and the coldness of the world may be a more just criterion of the value of the process than its author's estimate; but none the less is he actuated with the purest philanthropic motives in urging, as he does, his brothers to take it up, so long as his faith in it remains so firm. It is the method, too, as a method, and not merely his own plan that he is in love with; for he is quite willing to acknowledge other workers, and in the very paper to which we are alluding, in fact, accords a higher meed of praise to M. Ducos du Hauron than we ourselves could honestly give him.

M. Vidal, in short, belongs to that class of enthusiasts to whom unquestionably the world owes much, and who have only too often been laughed at when conferring their highest gifts on mankind. We have no wish at all to laugh at M. Vidal—far from it; but we would kindly submit that as yet his process has not shown in it anything that commended itself as practicable to the ordinary mind, and that until it does his ruling is not quite fair. It is stupid, doubtless, of ordinary photographers to be so short-sighted; but, after all, what can anybody ask that the most of them should do save look at what is brought before them from the point of view of the ordinary practical ends of life. So far off is heliochromy, as practised by M. Vidal, from any relation with these, as yet, that we do not wonder if photographers look at his samples and say—"Curious, very curious; but——" and leave the matter with a shrug where it stands. In short, if M. Vidal is to make the world adopt his process, and give to the world the good from it he dreams of, he must perfect that process himself, and be prepared to do without either countenance or substantial collaboration until he can come forth and say the thing is completely practicable. The great inventors whom he names have had to do so; and, however sorely it may pain him to be seemingly neglected, it would be wiser if he quietly accepted the neglect, and went into his task with that grim silence which would soon enable him to determine whether he really had invented anything or not.

AUSTRALIAN REMINISCENCES.

Photography in Australia twenty years ago!—yes, it must be twenty years since I got my first glimpse of the wonderful and beautiful art of copying God's creation and man's handiwork by the aid of the sun! At the age of twelve or thirteen photography was to me a source of unlimited surprise and admiration; how it was done I could not conceive. I saw the result, and from that day to this have been in love with the fascinating art. Let me introduce you to the *place*, the *people*, and the *artist*.

The first is a long, straggling town. At home it would, no doubt, be called a village; but in young countries small places and small people become of importance. So we resided in the "town" of Camden, consisting of one street, about a mile in length, along which, at intervals, are scattered houses (none very large) built chiefly of wood; there were some, however, built of brick, for Camden is a town of some antiquity—say fifty years old or so—and the brick buildings denote its respectable age. This is the *main* street, being part of the highway to other towns in the interior. There are some other streets and "squares" in the town; but these are, or were, to alter the tense, indicated principally by being "fenced" on either side, for the houses in them were few and far between. Its inhabitants consisted chiefly of a few storekeepers, a few tradesmen, and some farmers who cultivated the soil on the banks of the river on which the town is situated. The parson and the doctor were the aristocrats, and the "institutions" were the church, school, courthouse, and accompanying lockup. Perhaps to these should be added a couple of mills—one old windmill being picturesquely situated on a very high hill just above the town. So much for the *place* and the *people;* now for the *artist*.

To us villagers Mr. Ashton was a young man of rather remarkable appearance. He was genteely and quietly dressed, and wore what colonial people—perhaps English folk, also—call a "long-sleeved" hat. I suppose I need not interpret it as a "chimney-pot"—not that this was very remarkable, but he wore also a luxuriant flowing beard and moustache. Twenty years ago such hirsute appendage had not before been seen in our town, save once; that was when an old and prophetic-looking individual rode slowly through the town, announcing, in stentorian tones—"The Emperor Nicholas is dead!" and then, after startling us all out of our propriety, the venerable horseman passed on and disappeared entirely from human vision, but his announcement proved to be correct (as we learnt some weeks later), however he came by his knowledge. But this is wandering; so I will return.

Not many hours after the coach had discharged Mr. Ashton at the door of our principal inn it was rumoured that he was going to take "likenesses." Some said he would take "daggerytypes" of people, but he did'nt; he took simply positives on glass.

In the upper room of an unfinished building the artist established his studio, and took—oh! such exquisite portraits! So I thought then; and even now, in this advanced age, I think they were much above the average of more modern work. How I marvelled at the beautiful enamel-like surface, and the soft, delicately-tinted skin of my brothers, sisters, and self! One brother only, who was rather freckled, seemed much misrepresented in his picture.

One day I went up and sat for my portrait such an intolerable length of time for a boy—a nervous one—to keep perfectly still; however, the plate was brought out in a few minutes, dripping, and there was my image! But I had moved my eyes—at least, so Mr. Ashton said—and again I went through the ordeal. It took some time, however, before a satisfactory picture was obtained. Once the staring unblinkingly in the strong light brought the tears to my eyes, and in a fit of desperation I dashed my hands in and commenced to rub them. Judge of the photographer's feelings and expression when he turned to put the cap on the lens! Another time the nervous feeling experienced on coming before the camera caused such a suffusion of blood over my countenance that he was fain to wait until I had regained some self-possession. However, the pictures were taken alone and in a group; and for many years—I suppose seventeen or eighteen—they graced the wall of our little parlour, and were looked on as quite triumphs of photographic art, as well as invaluable momentoes of our youth. A short time ago a careless servant—no one but servants would be careless over such things—broke the picture and did'nt "save the pieces." That was the end of these much-admired and greatly-prized portraits. But the photographer has not, I am happy to say, come to an end yet; for I saw him in Sydney a month or two since looking hearty and jolly; and certainly, in appearance, not a very great deal older. Ashton was much the best specimen of a travelling photographer I ever saw; indeed, I quite believe what he said at the time, that he had been brought up to some other profession, but having become enamoured of the new art had learnt it, and followed it more for amusement than gain.

One evening when Ashton was in a jolly humour, sipping wine and eating cake, occasionally singing a pleasant song, my father asked how the pictures were taken; and we were forthwith treated to a lecture on the theory of photography. Of course we were but little enlightened when the lecture, which was lucidly and rapidly delivered, was concluded; and our instructor laughingly added—"and now, if you please, I want ten guineas." I think Ashton soon relinquished the profession, and I regret that not one of those whom I have met since in the same peripatetic line could claim the designation of "gentleman."

Some eight or ten years ago another character in the profession crossed the field of view, as a picture glides across the lantern-illumined disc. The scene is another little town, but so far "north" as to be classed as almost beyond the pale of civilisation. However, remote as it was, the dark art had penetrated into this interior of the Australian bush. In this instance it found its representative in Mr. Julius Smythe. The name was high-sounding, and Mr. Smythe was proud of his distinguishing appellation. His get-up, too, and general turn out was remarkable, if not attractively elegant.

On a spring van or cart covered by a canvas tilt were printed in striking characters—"JULIUS SMYTHE, *Photographer*." The vehicle was driven by Mrs. Julius Smythe, and served for a conveyance, a sleeping-room, dark room, and various other purposes—I fear, from its size, at great inconvenience.

During their peregrinations Mr. Smythe's attention was devoted to the care of a stock of horses; for that gentleman added to his artistic pursuits the less refined, but possibly more profitable, one of horse-breeding. As he travelled through a country principally occupied as cattle and sheep pastures, and over hundreds of thousands of acres without boundary or fence of any kind to bar his progress, the feeding of his stock of horses on the squatter's runs was to Mr. Smythe a very natural and easily-accomplished proceeding. Thus for some years did he follow art and horses through hundreds of miles of the Australian bush.

In the view the space is occupied by Mr. Smythe—an elderly, rather intelligent-looking, man, with a flowing grey beard—following a troop of from twenty to fifty horses, most of them being weedy, lean-looking creatures, two or three having bells strapped round their necks, which served the double purpose of giving musical notice of the artist's approach to or presence in the village, and leading him to their retreat in the event of their getting lost or straying away. Following Mr. Smythe is the before-mentioned cart, bearing the owner's name and calling, and driven by Mrs. Smythe, whose life did not appear a very womanly or enviable one. The scene passes before me twice or thrice, and then disappears.

Of the artistic productions of Mr. Smythe I cannot say much, having seen but few specimens. Suffice it to say that they were neither better nor worse than those of artists who preceded or followed him for some years; and that although he did pictures on paper when required, his principal business lay in the *positive* line. I fear ten years ago photography was not much appreciated in this place (indeed, I regret to say that it is little better in that respect now); at any rate, I have not seen many pictures of his production in this neighbourhood.

This was my second glimpse of the art whose life is light.

A. L. E. X.

PHOTOGRAPHY AND SPECTRUM ANALYSIS.*

[Cantor Lecture, delivered before the Society of Arts.]

I HAVE already referred to the extreme importance of photography in astronomy, and the point that I wish to urge tonight, after what I have stated regarding all the work which has been done up to the present time, is this—That what photography has been in the past to astronomy—what it will be in the future no one can say—such can photography, and such must photography, be to chemists and to physicists. Of course, in the way of photographic application, it is scarcely fair to say that a daily photographic record of the prominences around the sun is a question either of physics or of chemistry. But still the method which enables us, or which, I hope, will enable us shortly, to obtain a daily photograph of every prominence which bursts out—although absolutely invisible to our eyes—on the sun, is a method which depends on physical laws, and has nothing to do with astronomy in the ordinary sense. If you will allow me, I will show you now on the screen a photograph of a drawing which was made by an eminent Italian observer in India during the last eclipse. It is a drawing made by Professor Respighi of the sun's corona, as seen by the spectroscope; and I hope in the next eclipse we shall not any longer have merely drawings to refer to, but that we shall have a photograph which can be bodily brought here, and which will let us know exactly how the matter stood. You see there on the screen three rings—a red ring, a green ring, and a blue ring. They are red, green, and blue, because the element in that part of the sun's atmosphere—hydrogen—gives us lines in the red, green, and blue; and they are rings because the hydrogen atmosphere extends in the most admirably regular way all round the sun. In fact, we may say that in observations of this kind we use the corona instead of the slit, and if that is good for the corona it is perfectly obvious to you it is good for the chromosphere—for the brighter regions lying closer to the sun than the corona does—as we know that it gives a line of such intense blue, exactly where photography, as it is generally carried on, has its strongest *point d'appui* in the spectrum; and it is quite clear to you that we ought to be able to get a photograph of this every day, just as easily as we saw it in India during the eclipse.

We will next consider the application of photography, no longer to the mere solar spectrum, but to the physics of the sun. What is the solar spectrum? It is the continuous spectrum of the sun, *minus* certain portions where the light of the continuous spectrum has been absorbed. What have been the absorbers? The gases and vapours, generally speaking, in an excessively limited zone of the sun's atmosphere, lying close to the bright sun we see; close, I say, to the photosphere. This zone is called the reversing layer. Then, if the solar spectrum be the result of the absorption of this reversing layer, what will happen to the solar spectrum if the constitution of the layer change? Obviously a change in the solar spectrum. Now, recent researches carried on by means of photography show us that if you take any particular vapour in the reversing layer, which you may call A, for instance, and then assume that the quantity of A in the layer is reduced, the absorption of that particular vapour will be reduced; what, then, will be the result on the photograph of the solar spectrum? Some of the lines will disappear. Suppose that this particular vapour which we call A, instead of being assumed to decrease in quantity, increases in quantity, what will happen to the solar spectrum? The same researches have told us that as its quantity increases its absorption will increase, and that its increased absorption will be indicated by an increase in the number and in the breadth of the lines absorbed. What, then, will happen to the solar spectrum if any change of this kind is going on? The photograph of a solar spectrum taken, say, today, may be different from the photograph of the same part of the spectrum taken at some distant period. What is the distant period we do not yet know—whether three months, six months, six years, or eleven years; but, at all events, there is reason to think already that if we had a series of photographs of the solar spectrum, taken year by year, that we should see very great changes in the spectrum. Allow me to show you a photograph of a very limited portion of the solar spectrum, and I will prove my case; and let me tell you I could not prove my case if photography had not been called in, because if the existence of any particular metal, or of the increase of any particular metal, depends on such a small matter as one line among 10,000, what will happen if a man neglects to observe this change? People will say, "Oh! in a research of that kind it is altogether excusable if he has made a mistake." But if you have a series of phenomena recorded by means of a camera on "a retina which never forgets," as Mr. De la Rue has beautifully put it, and if you compare those pictures day by day, and year by year, the thing is put beyond all question when you get one line disappearing or another line appearing.

Now we have before us a part of the solar spectrum near the line H, and I wish to call your particular attention to one line. We have admirable drawings of the solar spectrum taken about the year 1860. If the draughtsman were recording by means of his eye the lines in the spectrum, he would not be very likely to overlook a line darker than some he inserts, but he might easily overlook finer lines. Now, it is a fact that in the most careful map that we have—a map drawn with a most wonderful honesty and splendid skill—a line is absent in the region indicated, which line is now darker than some that were then drawn, and that line indicates the presence of an additional element in the sun—strontium. I do not make this assertion thinking that subsequent facts will show the drawing to be wrong, but because I see reason to believe that what we know already of the sun teaches us that it is one of the most likely things in the world that strontium was not present in such great quantity in the reversing layer when the drawing was made; but, however that may be, I think you will see how important it is that this photograph, which I have just thrown on the screen, should be compared with photographs made five, ten, fifteen, a hundred, or two hundred, or as many years as you like ahead, and it is in this possible continuity of observation of the solar spectrum, carried on for centuries, that I do think we have in photography not only a tremendous ally of the spectroscope, but a part of the spectroscope itself. Spectroscopy, I think, has already arrived at such a point, at all events in connection with the heavenly bodies, that it is almost useless, unless the record is a photographic one. I am glad to say that only today I have had a letter from Dr. Draper, who tells me he has at last succeeded in getting an admirable photograph of the spectrum of a star. Now that is of the very highest importance, because the sun is nothing but a star, and the stars are nothing in the world but distant suns; and as long as we merely investigate the sun, however diligently or admirably we do it, and neglect all the others, it is as if a man who might have the whole realm of literature to work at should confine himself to one book, and that book probably not a very good representative of the literature of the country he was examining into.

So much for the application of photography to what may be called the celestial side of spectroscopy; but let me tell you that this, so far as spectroscopy is concerned, does not exist. To the spectroscope all nature is one, and it is absolutely impossible to make a single observation, either on a sun, or a star, or a comet, without bringing chemical and physical considerations into play; and I pity chemists if they employ the spectroscope in terrestrial chemistry—they have not done much in that way yet—but I pity them if they commence operations in that way, unless they take the sun and all the various stars of heaven into their counsel when they do it, because the spectroscope is absolutely regardless of space, and shows us that the elements which are most familiar to us here, or, at all events, a good many of them, are present in the most distant stars, and the spectroscope shows us those elements existing under conditions which are absolutely impossible here. Therefore, if a man is studying cadmium chemically, and does not go to the

* Concluded from page 391.

sun and see what cadmium is there, he simply leaves half his evidence out of the record.

There is another point, too: spectroscopy is, above all things, molecular. We are dealing with the ultimate atoms, or molecules, or whatever you like to call them, when, by means of the short wave temperature of the spark, we drive a substance into vapour. And if chemists, for instance, will simply ask themselves which substances have their lines reversed in the solar spectrum, I think, before they have thought that problem out—that very simple problem, as it seems—there will be such a flood of light thrown upon terrestrial chemistry, that the only wonder will be that it has not been seen before, years and years ago. These, you will say, are theoretical applications. It is perfectly true; and there are a great many other theoretical applications that it would be my duty, as it would be my pleasure, to bring before you, if time permitted. But that is not all. I have to refer to the application of the spectroscope in what are considered by some people more practical directions, although I am always sorry to see science get down to its practical side, because, when it has got there, it is more or less used up. The more you deal with the most abstruse considerations of science the more likely you are to get practical applications out of them, if you care more for practical applications than for abstract truths. But, however, in my next lecture I shall have to talk about the practical applications, which some people may consider of more importance, but before I do that there is one more method I wish to call your attention to. You have already seen how excessively important it was to use a slit instead of a round hole in these experiments. It was the verdict of Wollaston, and it was the verdict of Becquerel and Draper, as I have shown you tonight with regard to photography. You have also seen that we can use the circular corona as a slit equally well. Therefore, if we like to take a long slit and divide it into as many portions as you choose, we see at once the improvement that we introduce into photography. All we have to do is to divide that slit into portions as it were, by letting a window run down the slit, and when the window has arrived at the second part of the slit, let in light from a new source. Let me show you some photographs which illustrate better what I mean. Here is a single photographic plate on which a new method has enabled us to register no less than four different spectra; those of you who are more familiar with photographic processes will immediately see how it is that the number has not been forty instead of four. Having a slit of a certain length, if I open all the length of that slit at once I should get a spectrum the breadth of which would depend upon the length of the slit; but if I commence operations by allowing the light first to come through one small portion of the slit, then we shall get the light from the particular metal which I employ in the electric arc falling on one part of the plate, and registering itself on the photographic plate. Then, if I close up that part of the slit, and open another one, I shall be able through that newly-opened part of the slit, all the rest being closed, to photograph on the plate the spectrum of another substance, say iron. Then, having used up that part of the plate, I can close that portion of the slit, I can bring my window lower down, and there we have the spectrum of cobalt. The window has been brought further down, and there we have the spectrum of nickel, so that we have, as the work of some eight or nine minutes at the outside, a photograph—not a perfect one in this case, but this was the first one taken on this method—which will register with the most absolute and complete accuracy and certainty not less than 1,000 lines. Now a careful student of these lines, working as hard as he can, thinks himself very fortunate if he can lay down ten an hour. Therefore, as ten an hour are to 1,000 in seven minutes so is the eye to photography in these matters.

I have another photograph of a somewhat similar nature which I am anxious to place before you. We have here an absolute comparison rendered possible, by means of photography, between the lines of the spectrum of iron and the lines of the spectrum of the sun. You see that, in the case of most of the thick lines, you get a line in the solar spectrum corresponding with the lines of the iron. And, more than this, you see, I hope all of you, that these lines of iron are of different lengths. The reason of this is that I have been careful to photograph on the plate the lines due to the various strata of iron vapour, from the rarest vapour, which is obtained at the outside of the electric arc, to the densest which occupies the centre of the core, and you will see the most beautiful gradation as we pass from the outside part of the spectrum to the inside. This inside part represents the complete spectrum of the core, and the outside the incomplete and almost monochromatic spectrum of the vapour which surrounds the denser core in the middle of the spark; thus we have practically reduced the spectrum of iron to one line, instead of 460. That is the first photograph of the kind that has been taken. I say that not because I am proud of it, but because you all know how enormously photographic processes are likely to be developed the moment not one individual, but a great many, try their hands upon them, so that an immense improvement upon what you now see may be anticipated. Not only have we developed, in the application of photography to spectroscopy, a valuable ally to science, as we have in the application of photography to astronomy—and you know what that has done, and what it is going to do—but we have, I believe, what we may almost call a new chemistry, some day to be revealed to us by means of photographic records of the behaviour of molecules. Recollect that the difference between the iron spectrum of one line and the iron spectrum of between 400 and 500 lines is simply due to the difference in the arrangments of the molecules or atoms of iron in the centre of the electric arc and its exterior. There is one question which all lovers of the spectroscope may ask of photographers, and that is this—Why should we any longer be confined in registering spectra to the more refrangible end of the spectrum, when one of the very first spectra of the sun that was ever taken was a complete photograph of the spectrum, including not only the blue, the green, and the yellow, but the red, and the extreme red? I think that if photographers will study the action of light on molecules, and read that extraordinary paper of Becquerel's, and will give those who are familiar with the spectroscope, and those who are anxious to promote the progress of spectroscopic search, a means of extending photographic registration, not only into the green part of the spectrum, which they do already with difficulty, but to the extreme red, then the use of the eye will almost entirely be abolished in these inquiries. And although no one has a higher estimate than myself of the extreme importance of the eye, I think that the more it is replaced by permanent natural records in these inquiries the better it will be for the progress of science.

J. Norman Lockyer, F.R.S.

Contemporary Press.

THE ENAMELLED CAMEO *SOUVENIR* OR GLACE PORTRAIT PROCESS.

[Philadelphia Photographer.]

Take a piece of clear glass, free from bubbles or scratches, and clean it by immersing in a solution of concentrated potash over night. Wash thoroughly in clean water, and immerse for a few minutes in a mixture of nitric acid and water, one part of acid to three of water; let dry from the acid without washing. Now coat your plate with the following:—Plain collodion one ounce, glycerine half-a-drachm, and let dry. Then take sheet gelatine and soak it in cold water until it is soft; then put it in a cream pitcher or a wide-mouth bottle, and cover with water. Dissolve the gelatine by heat, immerse your print in this warm gelatine, and lay it face downward on the collodionised plate, carefully pressing

out all air-bubbles; now cement with gelatine a piece of thin Bristol board, previously dampened to make it pliable, to the back of your print. Let dry thoroughly, and loosen the edges with a knife-blade, by running around the glass between the print and glass, when the whole thing will leave the glass with a very superior polish; it is now ready for pressing in Ormsby's cameo press, the simplest, most practical, and cheapest cameo press ever invented. Any carpenter will make one for about three dollars. The press and process are free for the use of the fraternity. This process is superior to any. Where rubber is used in the collodion they will never crack in the pressing; and where the rubber gives less polish than collodion alone the addition of glycerine gives an extra polish. I enclose you a photograph of my press. It is made of maple wood, three-quarter inches thick. The raised centre for moulding is glued on. It is so simple the photograph explains it. The top and bottom are hinged together. My press and process have the endorsement of the Chicago Photographic Society.

E. D. Ormsby.

ACCESSORIES.

[Philadelphia Photographer.]

In no direction, probably, have photographers erred so much as in the use of accessories; and yet there is scarcely any pictorial subject that does not require the expression and character obtained by the introduction of some accessory.

Nothing has so bad an effect as a picture crowded with accessories having no connection with the principal subject. Many good artists run to an excess in this direction, and all rules of art and good taste have been so outraged by the great mass that have used accessories indiscriminately, without regard to fitness or effect, that the demand for pictures of this style has almost entirely ceased, and the bust picture, with but little more than the head and shoulders, has become most in vogue.

It is not to be understood, however, that accessories consist only in the objects that may be placed in the picture independent of the subject, such as chairs, tables, columns, &c.; but the drapery that may compose the costume is an important accessory, requiring taste and skill in its arrangement.

It is universally allowed that Raffaelle excelled all other painters in a graceful arrangement of drapery and a natural disposition of the folds. By studying the principles of the ancients he learned to consider the figure as the principal part, and that drapery should be regarded as an accessory—that it is intended to cover, and not to conceal—that it is employed not from caprice, but from necessity; consequently, the dress should not be so narrow as to constrain the members, nor so ample as to conceal them, but suitably adapted to the size and attitude of the figures represented.

The photographic artist has his drapery under control quite as much as the painter, and there is nothing in connection with composition that requires more careful study and a closer observance of nature than the disposition of draperies. Even in the simple bust picture, where there is so little to display, its effect is wonderful in giving a proper balance to the lines and contributing to the unity of the whole; but how much more important is it in a full-length figure, where its flowing lines and graceful folds may be made not only to give support and symmetry to the subject, but breadth and force to the whole, by a proper distribution of light and shade.

Variety in the use of accessories is a necessity that stimulates study and invention. Nature never repeats herself even in two sides of a leaf. Such precision belongs only to machine work; and in studying nature we learn that variety is no less necessary to a pleasing composition than unity. It is the want of this that has compelled so limited a use of accessories at the present time. The incongruity of photographing lawyers, statesmen, artists, farmers, preachers, ladies, and babies, all with the same surroundings, becomes too monotonous to be tolerated, and those who could not remedy the evil and retain the style have done well to substitute a style that was quite sure to give the variety that nature furnishes in the ever-varying phases of human forms and features.

A judicious use of accessories requires that they should correspond with the character of the subject. If it be light and gay a much greater variety of objects may be admitted than if it be grave and majestic. By multiplying objects a greater variety is obtained in line and light and shade, which contributes to gaiety. A variety of objects is inconsistent with the simplicity so essential to the grand style. The best works of art—those that are the most pleasing, the most enduring, and produce the most forcible impression—are always characterised by simplicity. In pictures of this character variety must be considered with reference to that undivided attention which a great subject demands.

In the use of accessories proportion is an important consideration. It is requisite in everything intended to please the eye. In works of art it refers first to size; next, to the degree of light and shade; and, again, to the force of expression required in the character of the scene represented. Any work is in good proportion if its details be neither too large nor too small when viewed in relation to the whole or to each other. For example: if a man be surrounded with furniture the proper size for a child he would be made to look like a giant; while, on the other hand, immense secretaries and mammoth chairs dwarf the subject, giving it an air of weakness and inferiority.

Harmony is an important element in a composition. There must be harmony of line, harmony of grouping, harmony of light and shade, harmony of expression. Each part must be so adapted as to correspond with the rest. The attitude must be in keeping with the expression; and the accessories must be true both to the character and the age represented. A harmonious whole is always more or less pleasing in itself, independent of subject or style.

Lastly: breadth is essential to harmony. According to Allston, "by breadth is meant such a massing of the quantities, whether by colour, light, or shadow, as shall enable the eye to pass, without obstruction and by easy transitions, from one part to another, so that it shall appear to take in the whole at a glance." To this unity is essential. When the objects introduced in a composition are multiplied, scattered, and divided, the eye, in searching for the principal object of interest, becomes wearied and perplexed, and the picture is then said to want repose. Unity, however, is distinct from harmony, and requires one point of view, one focus of light, one prominent character or group, one leading idea. There may be unity of parts when harmony in the whole is entirely wanting. Accessories, then, should only be used as such, and correspond with the subject, that the eye will be led involuntarily to the principal figure, while all else remains subordinate and dependent.

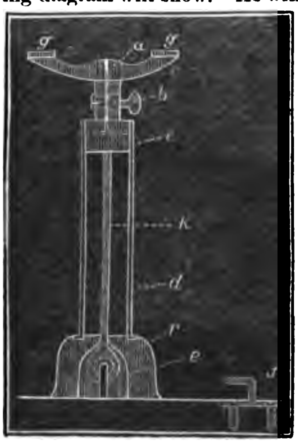
Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

At the second June meeting of this Society Dr. Vogel occupied the chair, and welcomed sundry guests and new members.

Messrs. Ross and Co.'s circular describing their new symmetrical lens for landscape reproductions, &c., was laid on the table, but the lens itself was not under discussion.

Herr Meyer, of Sondershausen, sent a description of a new plate-holder of his which six months' use had proved to be excellent. It held the plate so firmly that one could only detach it by using great violence; and it might not only be used with the largest plates when coating them with collodion, but also—which was of more importance—for holding the plates when they were being polished. This contrivance consists in reality of two parts—a sucker and a small air-pump—as the accompanying diagram will show. As will be seen, *a* is the sucker made of brass,



with an india-rubber band *g g* running round its rim, upon which the plate is laid. *b* is a double perforated air-pump cock of known adjustment, and *c* is the piston, which is adjusted so as to be air-tight in the tube *d*, up and down which it moves. *e* is the hollowed foot upon which the whole thing stands. *f* is an iron hook which, when fastened to the work table, enables the piston rod *k* to be more easily worked. The hook is inserted in the eye of the rod *r*, and the holder then worked up and down. When using it a plate—which may be yet wet from the washing—is laid on the sucker cell *a*. The cock is then turned so that the tube is open through into the sucker, and while the plate is held firmly down with the right hand the piston is drawn out by raising the whole holder with the left. This at once causes the plate to adhere firmly to the sucker. The cock is then turned so as to shut off the channel into the sucker and to open an outlet at the side, when the piston may be at once pushed down and the plate polished at will, it being held fast. Should the plate be very large the pump may be worked twice, in which case it is hardly possible to detach the glass. Of course when cleaned and done with a plate is withdrawn at once by turning on the cock so as to let in the air.

The Secretary did not think that plate-holders were in general necessary, and as to the one just described he was afraid that the india-rubber edging would soon get out of order, as was the case with the ordinary pneumatic holders, thereby producing much annoyance. There was danger, too, that the plate would be marked where the sucker was applied through the lowering of the temperature there, and consequent thinning of the collodion at that spot.

Mr. Bass then introduced the Weston burnisher to the meeting.

Herr Schneider, of Paris, undertook to explain its principle to the members. As our readers are already familiar with the instrument we may spare them the repetition of his remarks, merely saying that it was well received.

Herr Reichard, in particular, welcomed it, more especially as he had been trying one made for a similar purpose which he had found to be unusable.

Herr Prümm, however, reminded the meeting that he also had been constructing a satinising machine, which, although not yet quite complete, was full of promise of excellent results, and in proof he showed some pictures done with it. Weston's machine, he thought, now and then scratched the pictures.

Herr Schneider said that that might be due to inequalities in the polishing-rod, in which case a touch with a grindstone would at once remove the defect.

Some complained that the machine was a time-wasting one.

The Chairman said that it did not absorb so much time as the old mode of getting the same effects by gelatinising the surface, and did not waste so much material either.

Herr Schaarwachter recounted his experience with the india-rubber preliminary coating. He dissolved one part raw gutta-percha in ten parts of chloroform—a solution rapidly made—and then thinned it down by adding 1,000 parts of light benzine, and filtered. Plates coated with this exceedingly-attenuated solution were remarkably clean, and, after mounting, the film stood up well under the hand of the retoucher.

Herr PRÜMM confirmed this. When newly done he said that caoutchouc-coated plates did not stand up well under retouching, but after a little they become very hard. He used even a thinner solution than the one given, having, on the advice of the Chairman, made one of from 1 to 2,000, and he found the results decidedly better than before. He had varnished plates hot, plates just warm, and plates cold, and found that the hottest were the best. He was still inclined, however, to give the preference as to stability to the plates coated with albumen, but would look into this matter further.

Some plates were shown which exhibited the singular phenomenon of clear spots in the film, which appeared during intensification, and which persisted in appearing even when a new bath, new collodion, and fresh pyrogallic was used. It seemed probable that the spots were due, not to any defect in these chemicals, but to washing between operations with water that had become contaminated by hyposulphite of soda, or else that some of this dangerous substance had got mixed with the re-developer by some means.

After some remarks by the Chairman upon this point the meeting was adjourned.

Correspondence.

Where to Go with Slow Dry Plates, and How to Get There and Back Again.

NATURE, it is said, is infinitely varied; and it is fortunate for photographers that she is so, otherwise a single portrait negative would serve for many faces, and a single view negative for many views. It is fortunate, also, for landscape photographers that not only are there many different styles of landscape scenery, but also many different processes of taking views. Some of us eschew not only wet plates for views, but even rapid dry ones, and confine ourselves to slow plates. Well, nature can accommodate us even then with suitable subjects—subjects in which there is a great deal of light and no troublesome shadows with details hard to get out. My son has just returned from an expedition to such a spot in a part of France which would delight the heart of all slow dry-plate workers—the Isle de Noirmoutier, in Biscay's dreaded bay. He describes it as basking in an intolerable glare of light, with a whitish soil beneath your feet, and buildings all of which are whitewashed. In short, this little isle—only cut off from the main land at high water—would be a "heaven upon earth" to the slow-plate workers; and I am sure I shall be doing these gentlemen a good turn by describing how my son got to this glaring paradise and back, and how they may do the same if so inclined, though they may probably consider the diligence a preferable mode of conveyance to that which he selected.

He shipped himself, then, from here on board the "*Petite Esperance*"—a little French lugger of forty or fifty tons, with green top-sides and a zinc-coated bottom, and manned by two hands, viz., the skipper and his mate. She left Redon, not in ballast, but positively empty, so there was plenty of room for all three of them in the hold. Then, spreading all sail to the breeze, away they went, right before the wind, which was a stiff north-easter, at about two and a-half knots per hour; for this little craft, you must know, is not a clipper, her length, breadth, and depth of hold being about equal. After much knocking about she, in the course of days, arrived at her destination; and, after taking in a cargo of salt returned, loaded to within six inches of the water's edge, in which condition any one may see her at this moment in the Redon basin, waiting patiently until the month of October for the river to be navigable for the barge which is to convey her cargo inland—a pleasing holiday for our friends the skipper and his mate!

Whilst the little ship was loading at Noirmoutier, my son, of course, amused himself upon the island, which, as I said before, offers many temptations to workers upon slow plates. There is a funny old monastery partly in ruins, and a rocky point where a "fresh" of ever-green oaks—the only dark spot in the landscape—grows quite down to the water's edge; but the greater part of the island is devoted to salt pits, where they evaporate the sea water that is let in at high tide.

How French sailors fare at sea may interest my readers to know, in order that they may be prepared for this sort of diet when they ship with their camera in a French lugger.

At daybreak it is customary to have a drop of grog all round—*pour tuer les vers* (to kill the worms)—by no means an unscientific proceeding, but based upon sound physiological principles. It is well known that at that hour the worms, or germs, in all parts of the system which are reached by the circulation are on the *qui vive*, with their little mouths wide open; so you have only to pop in some neat alcohol, and you have no more trouble with them for the rest of the day. Breakfast is generally at eight o'clock, and the meal consists of black rye bread, salt butter, and a sort of garlic chopped very fine, and made into a sandwich. To wash this down the right thing is a mixture of vinegar and water, not too strong. Dinner consists of soup made of cabbage and onions, enriched with a lump of hard fat of rather questionable antecedents. Supper the same, the beverage being, as before, vinegar and water. But these meals are varied occasionally by a mess of shrimps, or small mullet stewed with garlic. These are caught in a triangular net spread between a pair of oars, whilst the vessel is drifting with the tide.

Now my readers cannot say that I never tell them *where* to go with the camera, and *how* to get there—the most important subject on the *tapis* with many of them just now.

As we are all on the move at this season my letter this week must needs be a light one; but those who desire stiffer reading will find it in another article from my pen in the present number.

Redon, August 14, 1874. THOMAS SUTTON, B.A.

ARTISTIC BACKGROUNDS.

To the EDITORS.

GENTLEMEN,—Referring to what was said by the "Peripatetic Photographer" *apropos* of Mr. Tilley's challenge to photographers in connection with his pictorial backgrounds, as soon as I saw one of Mr. Tilley's specimens of background printing I knew how they were done, for I produced similar things many years ago.

The way to obtain such effects as Mr. Tilley produces is to take the sitters against a *dark, plain* background. Then make a *negative on thin, plain paper* from an engraving, or any other suitable print, by contact or otherwise; fix it in hyposulphite of soda only and wash. When dry, lay the paper negative on the glass negative on which it is afterwards to be placed. Make a careful tracing of the figure, and cut it carefully away. Then fit the other part of the paper negative carefully on the glass negative, and print as usual. It will be seen at once that no *second* masking is necessary, but that the *plain* background of the portrait negative *is masked* by the part required of the paper pictorial negative.

But the neatest way of all to produce pictorial effects on the negative, without using a pictorial background behind the sitter, is to take the portrait on a dark plain ground, and then, by the Obernetter process of reproducing negatives, obtain any effect required. It is easily done:—Pour the sensitive compound of dextrine, &c., over the negative, dry it as directed; lay the negative selected face to face with the portrait negative, and expose them fifteen or twenty minutes in strong light. Now brush the plumbago over, carefully avoiding the head and figure of course, but work up to the outline all round. Dust off and print.

No washing is necessary, and the time of printing will be very little increased. If the portrait negative be thin, it will be considerably improved by the yellow tint imparted to it by the bichromate solution.—I am, yours, &c., J. WERGE.

11*a*, *Berners-street, August* 18, 1874.

[Mr. Werge has submitted to us a number of specimens executed by the methods described, and as he has also sent for inspection one of Mr. Tilley's productions, we are thus in a favourable position for instituting a comparison. From the similarity of the results—those of Mr. Werge being certainly equal, at least, to that by the unknown process—we imagine that, if both are not exactly alike, one process is quite as good as the other.—EDS.]

NEW BATHS AND OLD BATHS.

To the EDITORS.

GENTLEMEN,—In a leading article in your last issue an error of mine is pointed out, so far as regards the miscibility of ethylic ether with water. Roscoe's elementary work is a good A B C of modern chemistry, the facts being placed in such a manner as to be more easily remembered than in works for the advanced student. Of ethylic ether he says:—"It is lighter than water, specific gravity 0·736, and is not miscible with this liquid." For all that, you are right; it is miscible with water, I believe, in the proportion of one in ten. Having Roscoe in my mind was, I expect, the cause of the slip on my part, for pointing out which I must thank you.

The argument I used still remains intact, if for the words you quote the following be substituted:—"We all know that ether is but slightly miscible with water, but mixes with alcohol readily, while the latter is miscible with water in any proportion." The force of the argument depends upon the fact that a new bath solution does not take so kindly to the plate as one containing ether and alcohol.

By the way, your "P. D." has omitted a figure in your equation, making acetic acid $C_2 H_4 O$ instead of $C_2 H_4 O_2$. Your readers will supply the deficiency.

Aldehyde in small doses you have shown to be an accelerator when in the developer. However, it proves detrimental in the bath; for Mr. Dunmore says, on page 389, when writing of aldehyde, &c.:—"The detrimental qualities of these substances can be easily demonstrated by their addition to a bath in good condition."

While on the subject of baths I may name an experiment I have long intended to perform, the object being to avoid introducing other nitrates into the bath except they be insoluble in water. If the collodion were *salted* with ethylic iodide and bromide, would the following be the reaction on dipping a plate:—$C_2 H_5 I + Ag NO_3 = C_2 H_5 NO_3 + Ag I$, nitrate of ethyl being insoluble in water? If *nitrite* of ethyl be not formed it is possible such a method of salting would have advantages over the present one.—I am, yours, &c.,

Blackpool, August 15, 1874. W. E. Batho.

DEVELOPMENT.

To the Editors.

Gentlemen,—Mr. Winstanley's letter is not clear. Will he kindly explain? He says, in one part of his article:—"The result was that the side subjected to the acid development had palpably more density and palpably more detail than the side developed with the plain iron." But when summing up the results he says—"An addition of acid does retard the development," and "that it (acid) does not increase the density of the deposit."

These two statements cannot be reconciled. Is there a printer's error?—I am, yours, &c., X. D. E.

August 17, 1874.

A PHOTOGRAPHER'S PROBLEM.

To the Editors.

Gentlemen,—Given a background divided into four equal squares—Nos. 1, 2, 3, and 4. No. 4 is painted light, and reflects the maximum of light. No. 3 is tinted, and of such a shade as to reflect only three-fourths as much light as is reflected by No. 4. No. 2 is darker still, and reflects only one-half the light of No. 4, whilst No. 1 is darkest of all, and reflects one-fourth the light of No. 4. Let the background be supposed to be uniformly illuminated, and photographed with chemicals yielding one degree of density on No. 1, two degrees of density on No. 2, three degrees of density on No. 3, and four degrees of density on No. 4.

Suppose, now, I have another background, divided in four squares, whose light-reflecting powers are respectively 3, 4, 5, and 6, and which, with the same chemicals, yield a negative whose degrees of obscuration are also 3, 4, 5, and 6. It is required to develope the first background with the gradations of the second, and the second with the gradations of the first. How may this be accomplished?

The first background is harder than the second, and its gradations stronger, for its lowest tone reflects one quarter of the light reflected by its highest; whilst in the instance of the second the lowest tone reflects one-half the light reflected by the highest.

The question is really one of making negatives soft or hard without consideration of the lighting.—I am, yours, &c.,

August 18, 1874. The Square of Four.

ANSWERS TO CORRESPONDENTS.

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

*** We bespeak the indulgence of several correspondents this week, having to leave early for the meeting of the British Association. We hope to overtake all arrears in our next.

Geo. Jackson.—We thank you for having kindly sent us the book, which, after perusal, will be forwarded as directed.

Young Operator.—Selle's intensifier is composed of a mixture of ferridcyanide of potassium and persulphate of uranium.

Malthus.—The want of intensity seems to have been caused by the light from the white cloud shining into the lens, thereby causing a general flare over the plate.

P. M'Murdock.—It is now accepted as a fact by most photographers that an ebonite bath of the best quality does not affect the excellence of a solution of nitrate of silver.

Myostis.—We have received your letter too late to admit of our answering it previous to starting for Belfast to attend the meeting of the British Association. Kindly excuse us for a week.

B. P.—The original edition of the work respecting which you inquire *(Weale's Rudimentary Series*, article "Photography") was written by Halleur, and, in our estimation, it is very valuable as a work of reference.

Errata.—Absence from home has prevented Canon Beechey from drawing attention to some clerical errors which crept into his letter in the number for August 7. Line 12 of his letter, first column, page 381, should *read*—"which neutralises the *free* nitrate of silver," &c. The foot-note at bottom of the same column should *read*:—"Perhaps this is connected with the phenomenon in optics called 'interference' or 'diffraction.'"

J. S.—Triple lenses have had their day, being supplanted by cemented double combinations. The former have, however, been the means of producing good work. We advise you not to part too hastily with yours, as you might regret it when too late to admit of a remedy.

Mercurius.—Before taking the copy of the engraving examine the "publication line." This must exist on every engraving as a condition of its being made copyright, and it consists of the name of the proprietor and the date. The copyright lasts for twenty-eight years after the date on the engraving.

H. F. D.—The process of photolithography we published, and to which you specially refer, applies only to the reproduction of line subjects. We have seen several very good reproductions of large maps effected by its agency and an atlas is now in the course of publication in which every map is produced by the process in question.

Geo. Harvey.—1. The albumenised paper is decidedly bad; do not use any more of it.—2. Your hyposulphite solution ought to remain clear. Its becoming milky indicates decomposition.—3. Toning by sulphur may be effected by placing a print in a solution of hyposulphite of soda, to which a few drops of sulphuric acid have been added.

Van Lickdt.—The want of sharpness arises from one or other of two causes. Either the chemical and visual foci of the lens do not coincide, from over- or under-correction; or the plane of the ground glass upon which you receive the focus does not coincide with that of the sensitive plate. Respecting the method of taking Rembrandt portraits, full directions, with a diagram, will be found at page 462 of our seventeenth volume—that for 1870.

W. Smith.—This correspondent asks—"Will you have the kindness to inform me where I could procure a photograph of H.M.S. *Devastation?* I have tried several places, but without success. Also, whether any of "The Victoria Cross Gallery" pictures have been photographed, and, if so, where could I get them?"——We have a photograph of the *Devastation*, received from Colonel Stuart Wortley, by whom it was taken. If you send him a note he may, perhaps, favour you with a copy.

S. M. P.—1. The work in question will be of little use to you. It is intended for those who have a studio constructed on a definite plan recommended by the author. Your best method of procedure is to purchase some of the choicest specimens of portraiture sold in your city and endeavour to imitate them.—2. In the second edition of Mr. M. Carey Lea's *Manual of Photography* are supplied the conditions, as to tuition, required by you.—3. You will certainly be benefited by attending the course of lectures.

D. M. H.—We recently gave directions in a leading article by which the focus of a portrait lens, or, indeed, any combination of a similar nature, could be altered to a sufficient extent to enable two such lenses to be paired in a most accurate manner for stereoscopic purposes. We refer you to that article for all the information required, merely stating, in the meantime, that the principle of adjustment is based upon the fact of the equivalent focus being alterable by the separation of the lenses. The greater the distance at which the lenses are mounted apart the longer will be the equivalent focus of the combination, and *vice versâ*.

Fabian.—We do not know any better way of cleaning a daguerreotype the surface of which has become stained than by the following treatment:—Remove it from the case or frame; hold it by means of a pair of pliers at one corner, and pour over it a quantity of water sufficent to *stand* all over the plate when held level. Next apply a twenty-grain solution of cyanide of potassium, watching the plate with the greatest possible care. The stains will soon disappear, and the instant this occurs dash some water over the surface, following this application with some distilled water. It is of consequence that it be distilled. Next incline the plate gently downwards towards the corner held by the pliers, hold a spirit lamp underneath, and blow gently downwards until the surface becomes dry.

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

METEOROLOGICAL REPORT,

For the Week ending August 19, 1874.

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

These Observations are Taken at 8.30 A.M.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Rain Fall
13	29·75	SW	59	61	66	49	0·16
14	29·52	WSW	55	59	69	51	0·11
15	30·04	W	55	59	70	48	—
17	30·25	NW	53	57	71	49	—
18	30·38	W	55	59	74	48	—
19	30·46	NE	63	67	—	53	—

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 747. Vol. XXI.—AUGUST 28, 1874.

PURE NITRATE OF SILVER.

Some of our articles have lately been devoted to the impurities and the chemistry of the important chemicals used in our art, and, although nothing very new can be written upon the subject which heads this article, the appearance of inferior qualities in the market warrants us in penning a few lines upon this well-known substance. There should not be any difficulty in providing pure nitrate of silver for photographic use, as it is one of the most definite and easily made of all our salts.

The silver of commerce is sufficiently pure to make the salt from. We do not, of course, mean coins, but the silver as procured from the silver refiner, and supplied to the silversmith or worker. As thus found it is very fairly pure, and represents the large cake of metal which is left after the process of cupellation, or the separation of the silver from the silver lead.

The process adopted in this country is generally the one mentioned, and in nine cases out of ten yields a very pure silver, the contaminations being copper and small quantities of gold. The gold present is not removed by the process of cupellation, but is found intact in small particles disseminated through the silver. It is rarely that the copper is practically removed, although if sufficient lead has been introduced with the silver into the cupel the copper oxidises rapidly, and dissolving in the oxide of lead is theoretically all absorbed by the cupel. Therefore the copper could be easily removed if the proper amount of lead were always used; but as the smelter wishes to economise as much as possible, and as the longer the operation lasts the greater the loss upon the silver, the quantity of lead is kept at a minimum. Frequently from this cause copper forms a large and important impurity in commercial silver. Antimony, arsenic, bismuth, and zinc are associated with the silver in its ores, but are generally fairly removed, because the alloys which these metals form produce a hard and brittle silver, not like that obtained with copper; and as they would not roll, the products would be objected to by the silversmith. These metals are, however, found to be present in small quantities.

This metallic silver, being cut into pieces from the mass as it proceeds from the cupel, would be awkward to manage if the maker of the nitrate be not possessed of a furnace, and therefore it would be necessary for him to order his silver granulated. The actual process of granulation consists in melting the silver in a plumbago crucible, with a furnace which approaches a white heat, and pouring it then from some height into a vessel of clean water. If the crucible be at once put back into the fire and allowed to cool down gradually it will last a great number of times, which is important, a very considerable quantity of silver adhering to the sides of the crucible.

Coins are sometimes used for making nitrate of silver. They, however, cannot be used economically. The alloy of coins may be said to be above eight per cent.:—

	Ag.	Cu.
Standard alloy, Great Britain and Ireland...	92·5	7·5
French, German, and Austrian coinage......	90·	10·

Nitrate of silver is formed by the action of nitric acid upon the granulated silver obtained in the above manner, or may be made from the precipitated silver, or oxide recovered from the old baths.

Pure silver dissolves in nitric acid without effervescence, the nitrous acid formed being dissolved in the liquor, but directly the temperature rises violent evolution of red fumes takes place; therefore the operation must be performed under a suitable chimney, or in the open air, as regards this part of the performance.

The silver is dissolved in a mixture of nitric acid diluted with twice its amount of water; about eight times the weight of this mixture should be used to the silver employed. The acid dissolves the silver and copper perfectly, and leaves a slight black residue, which will generally be found to be gold. The solution is decanted or filtered through a filter of asbestos, glass, or gun-cotton, and evaporated until it marks about eighty grains to the ounce.

On setting this on one side to crystallise a crop of tabular crystals will be obtained which are contaminated with free nitric acid and copper. They are to be allowed to drain for at least twenty-four hours upon an earthenware drainer, and then dissolved in a small quantity of pure distilled water, and evaporated again to the crystallising point. If the silver be of the average quality, the crystals on drying will be found quite pure enough for photographic use, but the first crop will not answer the requirements of the photographic art. Fused nitrate of silver is sometimes used, but we cannot believe that there is anything to gain by using fused nitrate, as frequently there is a great deal to lose. It is true that perfect neutrality is obtained, but probably at the expense of the production of a little nitrite. Such specimens give a turbid solution from the presence of nitrite. Nitrite is by many manipulators considered objectionable. Sometimes fusion of the nitrate is performed as a preliminary stage of purification previous to crystallisation.

A large quantity of copper is got rid of by this method, nitrate of copper being much more easily decomposed on fusing than nitrate of silver. Nitrate of silver fuses at 219° C., and is decomposed at 320° C. The copper salt is decomposed at about 200°. The impurities found in nitrate of silver are few; as we have previously stated, nitric acid and copper are the chief of them. The adulterates are nitrate of potassium (nitre) and chloride of silver, the last being frequently found in fused nitrate of silver.

The fused nitrate is largely used for surgical purposes, and, strange to say, is preferred with the last-named impurities, owing to the toughness they give to the nitrate, which enable the surgeon to shape it with a knife to any form required.

The purity of a given sample of nitrate is easily determined, as regards the chloride, by making a diluted solution, when the chloride will be left. The argentometer will give no true indication of a nitrate of silver adulteration with nitrates of the alkalies, and the best method would be to perform a wet assay, which would show the exact amount of silver present. The wet assay is extremely easy and quick of performance if we have the necessary apparatus at hand, but out of the question if it be not forthcoming. It is simply based upon precipitating the silver solution as chloride by a standard solution of salt. Chloride of silver separates instantly from a solution of silver acidulated with nitric acid.

The standard solution of salt is generally made of such a strength that 1,000 grain measures equals, or will precipitate, ten grains of silver, or 100 cubic centimetres are equal to one gramme. When great nicety is required a solution one-tenth of this strength is used to finish off the assay. The results are extremely accurate, except mercurous nitrate be present, this being the only metal that vitiates the experiment. 100 parts of nitrate of silver contain 68·23 of oxide, 63·53 of silver, and 31·77 of nitric acid. This equals 84·39 of chloride.

But what the photographer wants is a ready qualitative test which he can apply himself. The presence of nitrate of potassium may be determined by precipitating the silver by a slight excess of hydrochloric acid, filtering, and evaporating the filtrate upon a watch glass to dryness with a few drops of a solution of chloride of platinum, and dissolving the residue in spirits of wine. If the original salt contained potassium a yellow crystalline precipitate of the double chloride of potassium and platinum will indicate its presence. A very ready method, also, by which the nitrates of the alkalies in nitrate of silver may be detected, is as follows:—Fuse the suspected sample before the blowpipe for a few seconds upon a piece of charcoal, and if the residue be alkaline it is proof conclusive of the presence of potassium or sodium. The mixed nitrates are decomposed, but the silver residue gives no alkaline reaction.

If the filtrate obtained in the first experiment—that is to say, the filtrate got after precipitating the silver with hydrochloric acid—be tested with diluted sulphuric acid, and a white precipitate be obtained, it is indicative of lead. It is stated that nitrate of silver is sometimes adulterated with nitrate of lead. We never met with such an adulteration.

IMPROVEMENTS IN ACTINOMETERS.

There is no doubt whatever of the value that would accrue to the photographer were he in possession of a handy actinometer, so constructed as to enable him to consult it for the purpose of ascertaining the actinic power of the sun in the same way and with the same degree of facility as he now consults his watch, his barometer, or his thermometer in order to ascertain the time, the weight of the atmosphere, or the degree of temperature.

The actinometric requirements of the practical photographer are not precisely similar to those of the meteorologist, who desires rather to secure a continuous registration for purposes of after-reference than for present use; hence a photometer in the observatories at Greenwich or Kew means something different from one in the studio or the pocket of the practical photographer.

On Friday last, in the Chemical Section of the British Association, Professor Roscoe exhibited a photometer which possessed several advantages over those hitherto in use for recording the actinic power of the sun in astronomical observations. It consisted of three portions—first, the insulating or exposing apparatus; secondly, the clock; and, thirdly, the battery. The insulating apparatus contains a band of sensitive paper upon a roller, which, by means of the clock acting upon the battery, is made to revolve under a suitable aperture, an exposure to the light being made for a period of time varying, according to circumstances, from one to thirty seconds, the actinic power of the light being ascertained by comparing the tint assumed by the paper with a standard graduated slip, each tint of which represents a definite value of solar energy. The clock and battery are retained in the observatory under the control of the astronomer in charge, while the insulating apparatus may be placed at any required distance, connection between it and the observatory being made by means of a wire. Once an hour, or at any determined periodically-recurring time, the clock acts upon the battery, completing contact, and thus transmitting a current to an electro-magnet in the insulator, by which the exposure is made and terminated. Exact details of the mechanism need not be given, as we feel confident that no photographer would think of having such a piece of apparatus, and probably few would even care to be made acquainted with its construction.

While Professor Roscoe was exhibiting the apparatus referred to we were reminded of a very simple kind of actinometer well known to many of our readers, and which, by means of a small clock, may, we think, be made to answer the purpose of continuous registration in a better and simpler manner than that of Dr. Roscoe.

In a former volume we described an actinometer of a very efficient kind, of the nature of which we shall here present an outline. A strip of glass a few inches in length is covered with collodion or gelatine tinted in a very delicate manner; at one end of the strip of glass there should be only one thickness of the collodion film, while at the other end there should be twelve, or even twenty-four, thicknesses, the ascent from the lower to the higher number being regularly graduated, so that while No. 1 is so transparent as to stop very little light, No. 24 is so dense as to be practically opaque. Now if a figure, No. 1, 2, 3, and so on, be written upon each step of this ladder by a perfectly opaque ink, it follows that if a sheet of sensitive paper be exposed under this graduated slip of glass the ground upon which each figure is seen will be coloured; or, to speak more properly, each figure will be rendered visible by the darkening of its background in proportion to the power of the light at the time the exposure is made.

Thus, if by an exposure of one minute No. 4 is upon subsequent examination rendered visible, we know that if upon an exposure for the same time half-an-hour afterwards No. 12 is visible a great increase must have taken place in the actinic power of the light. To effect continuous registration all that will be necessary is to connect the rollers by which the sensitive paper is propelled under the actinometer with a timepiece, which thus shall not only cause a continuous propulsion of the sensitive band, but, by means obvious to every one who possesses even a rudimentary knowledge of mechanics, may throw open a shutter in front of the actinometer for one or more minutes, as may be determined upon, closing that shutter again the instant the time has expired, and even registering upon the exposed portion of the sensitive band the exact hour at which the exposure took place.

An actinometer of this description would, we think, prove of equal value, while it would be simpler in construction and much easier to read than that of Dr. Roscoe.

A PLEA FOR MORE ATTENTION TO THE STUDY OF CHEMISTRY.

This is not by any means a new subject; but, although we have frequently taken it for our text, we do not think it is yet worn threadbare. The longer our experience of, and the more we associate with, photographers generally, the more we are convinced of the necessity for iteration and reiteration of any matter that ought to be widely known. We think it will be generally admitted that the literature of photography is at least not behind that of any other branch of science or art, and that those to whose care it is entrusted are sufficiently on the alert to keep their readers fully informed upon everything transpiring which at all bears on the subject, from the apparently most trifling "wrinkle" to the most important discovery. Of the multitude of readers to which such literature is addressed we know that there are a few who treasure up every item of information, and who are, in consequence, always ready to turn it to good account when an opportunity occurs; but we believe that with many it is like the "snow-flake on the river"—forgotten almost as soon as read, making no permanent impression, even on those who most conscientiously read every line of their journal, unless persistently repeated over and over again. In this fact lies the cause of the frequent rediscovery and reintroduction of much that should have been widely known, but which, in consequence of the modesty of the originator, had been overlooked.

When, nearly a quarter of a century ago, Archer's discovery of the application of collodion burst upon the world, and gave to photography a popularity unprecedented in the annals of science and art, what had before been mainly an amusement for the amateur suddenly assumed the importance of a great profession. The various steps in the operation of producing a picture were so simple, and the outlay for stock and apparatus so small, that almost every one who was dissatisfied with his then occupation turned professional photographer, and many made both fame and fortune by pictures which now would not be tolerated in any third-rate country village. By and by, however, the novelty wore off, and, when people ceased to wonder at the result, they began to look more critically at the product, and it was soon discovered that something more than a mere map of the "human face divine" was required. The demand, of course, created the supply, and the study of art became a necessity which those who disregarded went to the wall, while those who studied found their reward in continued prosperity, the result being that the bulk of the work now being done, both technically and artistically, would do no discredit to an R.A.

The force which has compelled the photographer to become an artist has, unfortunately, not been exerted in what we think an equally important direction. Photography is essentially a chemical operation, and he who is unacquainted with the nature and properties of the material with which he works, and with the laws which govern the changes which he labours to bring about, is only half able to meet and overcome the difficulties which are constantly occurring, and knows little of the higher pleasure which such knowledge gives; while, for want of that knowledge, his work is frequently little better than groping in the dark, and most of his experiences are valueless to the world, because unguided by intelligent, systematic aim. How much of the chemistry of the collodion film do we know today that we did not know twenty years ago? and what has been added to our knowledge of the latent image? Regarding the latter, much has, no doubt, been written, but we think we are fairly justified in saying that its true nature is still a mystery—a mystery which, doubtless, would have been solved long ago if all our operators had truly realised the importance of a knowledge of chemistry, and been able to bring such knowledge to bear on their daily work.

The various applications and advantages of such chemical knowledge are so obvious that we need not dwell upon them; but there is one direction in which its want is daily felt that we may briefly notice. It is evident that there is at present a feeling that photographers generally are not so communicative as they were wont to be, or as is desirable. To some extent this may be true; but there is still a large number of liberal, hard-working men, whose greatest pleasure is to give as freely as they get, but whose information, useful though it be, is yet shorn of much of its value from the want of properly-trained powers of observation. It is a pity that it should be so, and more especially as the necessary knowledge is really not difficult of attainment. We often hear it said, by way of excuse, that the study is so dry, and the time required so great, that the student must begin young or not at all. Now this is simply nonsense; there is no branch of science so interesting, and none more easily acquired. Three or four hours a week for a few months would so open the eyes and interest the understanding of any ordinary mortal that, without laying any claim to the prophetic mantle, we may safely assert that he who will make the trial shall have provided for life a source of pleasure for himself, and a power to interest and instruct his fellow-men.

In conclusion: we would offer a word of advice to students generally. Be a little more ambitious than the average of amateur chemists with whom we are acquainted, who are satisfied with an elementary knowledge of the inorganic bodies, and the laws by which they are governed. Let this be but the stepping-stone to an acquaintance with the chemistry of the carbon compounds, which, though vast in extent, is nevertheless simplicity itself, and will be found to be the key-note to nearly all that the photographer wants to know.

The professional photographer will find such a knowledge of much use in his daily work, of great value in his intercourse with his friends, and, above all, it will invest labour with a new charm, and life with a dignity hitherto unknown.

A GENERAL *RÉSUMÉ* OF THE THEORY OF THE LATENT IMAGE.

I find it impossible to quit this most fascinating subject of the nature of the latent image upon a bromide of silver film without bestowing one more article upon it before laying it aside for other matter; for, after all what other matter has half the real practical importance of this? Let me, then, offer a general *résumé* of what has been said in my four preceding articles on this subject.

If we adopt the physical theory of the latent image we have to assume that light merely loosens the affinity between the bromine and the silver, which can remain in this state for seconds or minutes before they actually part company under the continued action of light. We have to explain why the latent image can be effaced by nitric acid and other agents; and we have also to explain why the presence of organic matter plays so important a part in its formation. Of all these phenomena the physical theory offers no explanation at all. It remains a mere barren hypothesis, which is of no practical use to us whatever. It is very easy to say that because no *visible* change is produced in the film by the exposure to light in the camera therefore no *chemical* change has been produced in it; but the supposition of a physical change only involves us in a host of inexplicable difficulties from which no known chemical analogies can extricate us.

We turn, then, more hopefully to the chemical theory, which asserts that in the case of an exposed bromide of silver film the sky and highest lights of the negative have been changed by the action of light, throughout the entire thickness of the film, from bromide of silver *plus* water, *plus* organic matter, into some other compound of silver, which, singularly enough, is not distinguishable in colour from the unexposed parts of the film when viewed in the dim light of the operating-room.

What, then, is this new compound? It cannot be sub-bromide of silver, because that is dark grey, and not colourless like the bromide. What, then, is it? In order to answer the question we have to do what is constantly being done in all scientific inquiries, namely, make a supposition, and then try whether facts will bear us out in it, and whether it is consistent with other known analogies which chemistry offers. The supposition which I have ventured to make is that the latent image in a washed and organified bromide of silver film is an organic oxybromide of silver, represented by the formula $Ag\,Br, Ag_2O, M$—M being the symbol for organic matter.

The idea that bromide of silver, $Ag\,Br$, will combine with oxide of silver, Ag_2O, is supported by many analogies in chemistry; and it is pretty certain, also, that oxide of silver will combine with organic matter. My supposition, therefore, of the existence of such a compound as organic oxybromide of silver is not far-fetched or extravagant; on the contrary, it is extremely probable that there should be such a substance, and that organified bromide of silver, during the process of reduction by light into this grey sub-bromide, should pass through this peculiar compound, which contains one atom of oxygen more than the sub-bromide. Should it be asked why no chemist has ever lighted upon this particular compound in the course of his experiments the answer is simple enough. The compound is one which could not possibly be examined by daylight, because it would pass into the grey sub-bromide of silver by the mere action of light during the process of investigation. From its very nature it would be too unstable to be likely to have attracted the attention of chemists; and when we reflect that even the grey sub-bromide of silver, which is comparatively stable, and may be easily produced by the ounce or the pound if required, has never yet been made the subject of careful investigation by analysts, it is not surprising that the oxybromide should have escaped their notice.

And here I cannot but express my surprise that year after year should be allowed to roll by without any chemist thinking it worth his while to investigate the properties of grey sub-bromide of silver and give us the exact formula for it. To appeal to *photographic* chemists is to appeal to a body of men who appear now to have drifted out of existence altogether, so seldom do we now find in the photographic journals any contributions on the chemistry of our art; but there are surely other chemical investigators to whom a new compound of so important a metal as silver, and which can so readily be produced in any quantity, might offer an interesting field for investigation, particularly when an important industry, in which thousands of hands are employed all over the civilised world, is based upon the transformation of bromide of silver into this particular substance, or into one between the two. A chemist has only to put a pound of bromide of silver into water and expose it to light, shaking it for a suitable time, and changing the acid water for fresh water, when required, until the action ceases, and he will obtain a quantity of dark grey material, the nature of which has not yet been investigated, and the formula for which it is most desirable to know. That is really the fact; and I cannot but think it most singular that this investigation has never yet been made.

Assuming, then, the existence of an oxybromide of silver, how is the developable latent image formed? It is formed by the aid of the organic matter in the film in the following way:—We find that a normal alkaline developer will reduce bromide of silver unless it is protected by organic matter. In a film which has not been organified the exposed and unexposed parts all develope together, and general fogging is the result. A latent image may, no doubt, be formed in a film which has not been organified, but that image cannot be developed satisfactorily.

How, then, does organic matter in the film enable us to obtain a developable latent image? In the following way:—The developer produces no effect upon the *un*exposed parts of the film, because they are protected by the organic matter. It is quite possible—as Mr. M. Carey Lea once suggested—that bromide of silver and organic matter may enter into chemical combination, and *this* may render the reduction of the unexposed bromide of silver by the normal alkaline developer more difficult than when no organic matter is present; but in the exposed parts of the film, where an organic oxybromide has been formed, the organic matter has attached itself solely and entirely to the oxide of silver, and the bromide of silver remains without its protection, and is, therefore, reduced.

Such is my theory; and I offer it as the result of years of thought and hundreds of experiments. The only real difficulty which I now find in the way of accepting it I will state frankly. It is as follows:—Take a film which has been fully exposed to a strongly-lighted view. According to my theory the sky part of that film has been changed into organic oxybromide of silver throughout its entire thickness. Now, before developing the image, let us treat it with nitric acid. This ought to dissolve the oxide of silver in the oxybromide, and leave nothing but the bromide of silver; whilst this bromide of silver ought now to be less in quantity than in the unexposed parts of the film, so that the sky ought to be more transparent than the rest. But practically I do not find this to be the case; and there lies my difficulty, which I state with perfect frankness. We know that in the case of a converted positive the different thicknesses of bromide of silver in different parts of the film show with marked distinctness. Ought they not, therefore, to show when the latent image is destroyed with nitric acid before development, if my theory of it be correct? In the case which we are considering the sky part of the exposed film would only contain one-third as much bromide of silver, after the nitric acid treatment, as the unexposed parts of the film; but I confess I cannot detect this difference in the two spaces.

It appears, therefore, that whatever view we take of the nature of the latent image there are difficulties, and the matter still remains a most interesting problem to solve. I cannot, however, but think that the solution of it which I have now suggested is the most plausible that has yet appeared; and with that conviction I hand the matter over to the consideration of such of my readers as may be interested in trying to puzzle it out. It is most desirable from time to time to bring this subject again upon the *tapis*, and review all the facts which bear upon it, including those which fresh experiments may have brought to light. The great point is to have no bias, but to be open to conviction, from whatever source or direction it may come. I have said nothing yet upon the way in which unconverted bromide of cadmium may act within the film. In the unexposed parts it, no doubt, aids the organic matter in restraining the action of the developer. In the exposed parts it seems to add to the density of the reduced silver, when viewed by transmitted light, probably by causing it to be reduced more slowly and in smaller crystals. It is quite conceivable that light might penetrate through the interstices between large crystals, whilst smaller crystals would stop its passage more completely.

Another way in which unconverted bromide of cadmium in the film would act would be by preventing the formation of bromo-nitrate—a compound which under the action of the alkaline developer would be reduced in pretty much the same way as the material of which the latent image is composed. Organic bromo-nitrate would be reduced for the same reason that organic oxybromide is, and the entire film would be fogged.

It is quite inconsistent with the whole of my own experience to suppose that a fully-converted bromide film, containing free nitrate and organic matter, can be successfully developed by the alkaline method, as Mr. Carey Lea and others seem to suppose.

THOMAS SUTTON, B.A.

REMARKS ON CARBON PRINTING.*

In my last notes on this subject I addressed myself mainly to the single transfer process on a flexible support; I propose now to treat of other branches of the autotype process—double transfer printing and printing upon various media. I have said that for general use in the studio I consider the carbon process mainly applicable for enlargements and coloured work; but for the latter purpose the repugnance shown by nearly every artist I have been connected with to paint upon a carbon photograph has been invincible to a degree I can scarcely convey to my readers. I have given them pictures—first-rate carbon prints, scarcely discernible from silver—and they have done them under protest, and politely told me they would do no more of the kind. "They would crack," "they would peel off," "they would last a shorter time than silver prints," &c., &c.

There were, of course, at first, some exceptions to this general rejection of the process, but they were few. At last, however, by dint of entreaties, persuasions, and threats I find their objections giving way, and nearly every commission I now execute is upon a carbon basis, and thus I have the satisfaction of knowing that the stigma of fading can never attach to the photographic part of the work. I have far more pleasure in receiving the commission. It is impossible to avoid feeling something very like a twinge of conscience when receiving a good round sum for a beautifully-painted silver picture upon paper, whose beauty all experience shows is likely to prove fugitive and far from being "a joy for ever." But, above all, the promise of permanency enables one to get many commissions that otherwise would never come to a photographic studio at all, to such an extent already have the public become aware of the frequent fugitiveness of coloured photographs. A word to the wise here:—Nearly all carbon pictures painted in colours are done in body colour to get rid of the heaviness in the shadows, and *unless the utmost care be used to preserve the painting from damp and deleterious vapours the colour will blacken, though the photograph itself may be intact;* "faded photographs" again would be the verdict.

In producing autotype pictures of either kind—single or double transfer—very great pains must be taken to keep the washing water free from all mechanical impurities, a very few grains of visible solid matter sufficing to mar the beauty of many otherwise perfect prints. Unlike a print on albumenised paper, a carbon picture once dried retains with great tenacity every particle of foreign matter which may have lodged upon its surface, sponging it only serving to remove the image simultaneously with the offending spot. Floating particles, as related in my last note, are also a fertile source of blisters.

In my earliest trials I experienced great difficulties in transferring off a rigid support. I spoiled picture after picture in my attempts. At times the print would stick entirely to the plate without any attempt at coming off; at others the print would appear to behave perfectly, a slight pull only being needed to loosen it entirely. On examination it would be found that that slight pull was the ruin of the picture—an eye, or the nose, or some other equally important part, being represented by a bare patch. Patience and experiment overcame all obstacles, and I now rarely fail. I think I may name three chief causes for this difficulty:—First: the resinous solution not being evenly spread upon the glass. Second: this solution not being strong enough. I could never work with the formula indicated in the Autotype Company's *Manual*, viz., three drachms of resin and three drachms of wax to a pint of turpentine. The formula I now use is as follows:—Three drachms of resin and six of yellow beeswax to the pint of turpentine. Third: unsuitable transfer paper. I am inclined to believe that double transfer paper (which is made by coating paper with a solution of gelatine and chrome alum) will not keep in its best condition for an indefinite length of time. Some that I had in use about twelve months ago, and which answered admirably, I have lately found most troublesome. It is almost insoluble, and requires water nearly approaching boiling point to bring it into a proper state for transferring. Unless the double transfer paper is made very soft upon its surface—so much so as to feel quite slimy—the transfer will not be successfully made. It may here be noticed that water free from floating matter is essential to success, as the enclosure of the smallest quantity of foreign matter between the transfer matter and the print will, in five cases out of six, result in a faulty transfer. In using paper as the temporary support the chances of success to the tyro are greater, as, though all the precautions just named are necessary, a little less care will not be productive of so much evil as in the use of rigid supports.

Referring, now, to carbon pictures with a polished surface, I may frankly say that my success with them has been very indifferent, except with a modification which considerably adds to the trouble and cost of the process. I allude to coating the polished glass surface with collodion before developing the print. There is then no difficulty whatever in the transfer, and in developing the picture comes out beautifully, and free from blisters or other defects to a remarkable extent. When transferred to the final support of paper these pictures with a brilliant surface possess much beauty, and for small work which it is not intended to colour they would, perhaps, be more likely to succeed with the public than any form. I, how-

* Concluded from page 353.

ever, never meet with these carbon prints with a glassy surface either exposed for sale at the shops or sent out from the studios of those who have taken up the autotype process. I also do not find the professional autotype printers at all anxious to recommend them; hence I conclude that even with all their experience the working of glazed pictures is found to be attended with too many inconveniences. This, however, is of little import, for to my mind the prints with a matt surface have such an exquisite charm—such a delicate beauty peculiar to themselves—that no other kind of autotype print can for a moment be compared with them. I believe them to be the carbon print of the future, and if only an artist of originality and talent would spend some little time in overcoming the technical difficulties connected with working upon them, and would elaborate some new mode of combining photography and painting in this connection, a most pleasing result might be produced, and one which also would pay well.

This is my second digression from the professed bounds of my subject; but I am sure I shall be forgiven by any and every one who will take my remarks to heart and act upon them. If we are to make a great future for our art we must neglect no means of elevating and improving its processes; and these matt autotype prints are, beyond compare and beyond doubt, the most beautiful, the most artistic, and the most likely to find favour with educated tastes of any paper pictures of their class. They are the most difficult of all to produce well, but this, I am convinced, is a circumstance that will not weigh with most of our high-class artists; I am, indeed, more inclined to think it would be an incentive.

Passing on to pictures in which the temporary support is flexible, it will suffice to say that similar precautions to those necessary for the rigid support must be taken; but I may observe that far less trouble is needed, and fewer failures are likely to take place. It must, however, be noted that wax and turpentine alone are needed to prepare the surface of the paper, the formula just given being intended for a rigid support with matt surface. Prints intended for artistic working upon afterwards may be transferred from a flexible support quite as well as from a rigid one. The flexible support is useful, too, in that it can be cut into any shape with the print upon it without interfering with the ease of transferring; and thus groups can be put together, and figures isolated from surrounding encumbrances, animate or inanimate, with the greatest ease. Under other circumstances than these, however, I adhere to my recommendation of transferring off matt surfaces. One may then also use any negative, as there is no necessity for their being reversed.

Upon opal glass as a final support the best matt effect is produced by the single transfer process. It requires considerable practice in the double transfer process upon opal to enable one to hit the proper strength and manner of using the preliminary coating in order to prevent the resulting print being covered with little reflecting patches. If the chrome gelatine be not strong enough it will not hold the print; if it be too strong these disagreeable spots will appear in great abundance.

In using opal glass I have met with a difficulty which I do not ever remember seeing mentioned. It occurs in all sorts, whether flashed or pot metal, patent plate or crown. I am alluding to a strong discolouration, sometimes deep and sometimes slight yellow, which generally is found indicating the size of the tissue used to print the required picture, if such tissue be smaller in size than the glass. This was a great source of trouble, many most beautiful transparencies being spoiled by a hideous biliousness overspreading the whole picture, which no washing would clean. Ultimately I found a very simple, but thoroughly effectual, remedy for it. A solution of nitric acid—about one part to twenty of water—poured over the whole picture will cause the stain to disappear in a most magical manner without any risk of injury.

In printing on ivory it may be desirable to put a little weak alkali in the mounting and developing water. A plain photograph on ivory looks very nice—it has beauties all its own; but to paint upon a photograph on ivory seems to me to be so much time thrown away. Ivory paintings are prized for the beautiful, lucid transparency with which effects of flesh can be rendered upon them; if body colour be used to kill the heaviness of the photograph the whole beauty of ivory is lost, and an image on paper could be used with results quite equal.

In making transparencies on clear glass for the magic lantern, for enlarging or any other purpose, I never met with success till an old carbon printer told me the plan of giving the glass a preliminary coating of an exceedingly attenuated solution of gelatine and chrome alum. No difficulty will then be experienced; while without its aid I found it impossible to avoid innumerable blisters, and was generally unable to keep the print on the glass at all during development.

All autotype prints are liable to faults where a heavy black comes in immediate proximity to a pure white (a light grey similarly placed would act without any difficulty being experienced). This fact at once leads to the suggestion that when masking is required on a print—as, for instance, a picture which has to be painted upon—it must be done on the *back* of the negative, thus producing a sort of "safe-edge" on a very small scale, which is quite enough to obviate the danger of tearing or washing up.

I think I have exhausted my *repertoire* of hints, and I hope some of them may be of assistance to beginners in carbon printing. I will conclude with what I think is the most valuable hint of all:—*Do not sensitise your own paper, but purchase it ready sensitised.* The difference in expense is trifling, but the results are marvellously different. The ready-sensitised tissue is not made by impregnating the ordinary insensitive tissue in the bichromate solution, but it has the bichromate incorporated with in the process of manufacture. Whether the latter circumstance accounts for the vast difference in results I cannot say; but this I can say, that the sensitive tissue works beautifully, and very different from that of one's own sensitising, though made with the utmost care and nicety. It is soluble, quick, long-keeping, free from blisters, and gives whites of far greater purity. I have kept this tissue in a plain tin box under all changes of weather, including the hottest, for as long as three weeks, and it has given most excellent results at that age. I should be afraid to say, indeed, how long it would not keep.

The longer sensitive tissue is kept the more insoluble it becomes, and very hot water is required to develope the image. As a set-off to this it is found that the sensitiveness increases in a much quicker ratio than the insolubility—so much so that tissue a fortnight old might easily be three times more sensitive than that fresh from the manufacturer. G. Watmough Webster, F.C.S.

THE LATENT IMAGE.

In last week's number of The British Journal of Photography Mr. Sutton completed a series of articles on the above most important subject, adding one more to the list of theories connected with this question. In the following remarks I wish to indicate a few of the points requiring further elucidation ere this latter theory be accepted to the exclusion of all previous ones.

At the commencement Mr. Sutton draws a line between the rival theories of the chemical and physical action of light, giving his opinion in favour of the former. Here I am entirely at one with him, but would respectfully submit that the sub-bromide theory, which, if I understand him rightly, he includes under the latter head, can hardly be so placed. As the result of numerous experiments conducted by various persons, it has been placed beyond doubt that, under the action of light, bromide of silver gradually gives up its bromine; and if the exposure be sufficiently prolonged sub-bromide or an analogous salt is the result. Starting on this basis previous theory has supposed the latent image to be formed by the partial decomposition of the sensitive compound contained in the film, the relative degree to which this action is carried constituting to a great extent the distinction between the physical and chemical theories—the former holding the silver bromide, after exposure, to be in a state of atomic "excitement," the normal affinity of the halogen for the metal being greatly lessened though not absolutely destroyed; whilst the latter supposes a distinct evolution of bromine to take place.

In opposing this view of the question Mr. Sutton adduces several reasons for its rejection, the first being the destruction of the latent image by nitric acid. It is surely not so hard of belief, as Mr. Sutton appears to think, that so powerful a reagent as nitric acid should destroy the delicate and invisible impression caused by a few seconds' exposure in the camera, *however* it may be constituted. He then proceeds to argue that, from the change of colour produced by a prolonged action of light, the substance cannot possibly be sub-bromide of silver, "because that is dark grey, and is not affected by nitrate of silver, which the latent image is." This is, I fear, trenching upon ground too purely hypothetical to make it worthy of acceptance as a proof. Granting the existence of a dark grey sub-bromide, or, rather, allowing that to be its distinctive colour, is there any valid reason why that substance should not, under certain circumstances, be found of a different colour? As an instance, I may note the difference in appearance between gold in its most pure state as precipitated from solution of its chloride and the same metal in its more familiar state. To use Mr. Sutton's own words, "certain substances are known to change colour without betraying any chemical change." Where, then, is the impossibility of the formation, under different circumstances, of a substance whose chemical composition may be constant, though it vary frequently in outward form. Surely within the bounds of chemistry we have far greater anomalies. I may here remark that I think Mr. Sutton lays more stress than is necessary upon this matter of the change of colour, and also that he is wrong in supposing the sky and highest lights of an exposed film to be converted through their whole thickness. Were such the case, development would be almost instantaneous. It is, of course, possible to so prolong the exposure as to bring about that result; but in a duly-exposed film the change which takes place I imagine to be almost entirely on the surface, the action set up by the development of the invisible image thus formed being sufficient to carry the reduction throughout the entire film in such portions as the sky.

I have attempted to show that the non-change of colour is not necessarily a proof that the invisible image may not be formed of sub-bromide of silver or an analogous substance, and this I hold even supposing Mr. Sutton to be correct in his belief that the film is changed throughout. If, on the contrary, my own view be the correct one the argument is greatly strengthened.

Mr. Sutton then proceeds to suggest oxybromide of silver as the probable result of the light's action upon the bromide, and gives the following formula as explaining the reaction:—

$$\text{“}3\,Ag\,Br + H_2O = Ag\,Br, Ag_2O + 2\,H\,Br.\text{”}$$

This may be all very clear in working Mr. Sutton's own "moist process;" but in a *dry*-plate film whence comes the atom of water which supplies the necessary oxygen? In any case, however, whether the oxygen be derived from water contained in the film or from the atmosphere, a portion of the bromine will have been disengaged from its equivalent of silver, remaining in the former case in conjunction with the hydrogen as hydrobromic acid, and in the latter as free bromine.. But even supposing the oxygen to be forthcoming, chemically speaking, it appears improbable that after the expulsion of a portion of the bromine, oxygen, with its less powerful affinity for silver, should take its place.

I must confess to an entire ignorance on the subject of oxybromide of silver, but should imagine it "*might*," very probably, "be of a pale yellowish colour," and, from its composition, should also consider Mr. Sutton correct as to its, at any rate partial, solubility in nitric acid. It appears, however, that there is lack of proof of the existence of this valuable though hypothetical substance, and in this connection Mr. Sutton says "there is nothing improbable in the existence of oxybromide of silver. * * It is not unreasonable, therefore, to assume the existence of this compound when the assumption seems to afford a clue to the solution of the problem in hand," &c. Very true; but we should guard carefully against what may appear like inventing a substance to suit a theory.

W. B. Bolton.

DR. VOGEL AND DR. MONCKHOVEN ON COLOURED FILMS OF BROMIDE OF SILVER.

Since Dr. Vogel published his strictures in reply to the paper of Dr. Monckhoven, which we published in our columns, he has written to his friend and sent him specimens of the actual results obtained. These appear to have had some considerable effect upon Dr. Monckhoven, for he now comes forward, in a return letter, with considerable modifications of the opinions expressed by him in that paper, and, if not yet quite able to agree with Dr. Vogel's doctrine, he nevertheless thinks there is something in it.

It must be recognised, he says, that it only takes a few seconds to obtain an image of the solar spectrum on bromide of silver, even with a slit ten times as small as that used by Dr. Vogel. There is, therefore, he thinks, a double action manifest in the plates of his *collaborateur*, and he is astonished that so acute a mind as his has not discovered the fact. In Dr. Monckhoven's opinion the light of the spectrum takes probably shorter time than a second in which to impress the image on the bromide plate from violet to blue green. After that, at the close of a given number of seconds, the plate becomes affected by the diffused light which, escaping from the prism, covers the whole field of illumination. The yellow and red rays of the prism then act as continuators, and here Dr. Monckhoven thinks the coloured films play an important part. The discovery of Dr. Vogel is in this regard, in his esteem, a real one. The colouring matter quickens the action of this after-glow, so to say, and he is willing to do all he can to help that gentleman to work out important results from his discovery.

Such is, in substance, Dr. Van Monckhoven's new opinion, but it is by no means satisfying to Dr. Vogel, concession though it be; for, in the first place, he thinks that the distinction which is drawn by his friend between exciting or starting and continuing rays is one that will not hold good. The fallacy of such a notion he has, in fact, long ago exposed. All rays are chemically sensitive if the proper conditions be observed. While, therefore, glad to see that Dr. Monckhoven does recognise that colour plays an important *rôle* in determining the action of the red and yellows rays on a bromised film, he cannot accept the theory offered to him at all. Becquerel's theory, which it is, is in his opinion of no value. Becquerel observed that when chloride of silver or bromide was exposed for a short time to the daylight it was then sensitive for yellow rays, which apparently had no power over it before, and hence he called these latter the "continuing rays." But the phenomenon is susceptible of quite another explanation. Through the feeble action of diffused light chlorine is formed, which is sensitive to the yellow rays, and which it is not wonderful, therefore, to find strongly acted upon. But if the chlorine be made pure, and exposed from the first without previous lighting in diffused light to the yellow rays, it will do just the same. If the theory of Dr. Monckhoven be right in regard to these plates, moreover, how happens it that with an increase of the sensitiveness of the yellow and red rays is accompanied a diminution of that of the others? Continuing action of the light would not account for that. Plates so coloured and exposed a short time show images of the red and yellow, but not a trace of the blue, when the image is formed of chloride of silver and coloured with naphthaline red; and in this case, were the chlorine colour given time, the red rays would here be the exciting agents and the blue the continuing.

Dr. Vogel is probably right in his criticism so far as his *confrère* is concerned, and to us it looks much as if both of them were a little at sea. Dr. Vogel, for instance, has neglected to take cognisance of the possible danger which his red-coloured film is under of being made insensitive to the blue rays simply because they cannot get at it to excite it. When he manages to take a plate showing the action of the red and yellow rays, and not of the blue or violet, in the space of half-a-second or so, and not in the space of time which ordinary photographic experience tells us would be quite long enough to enable one to get the image of a brilliant red object in any case, we shall begin to suspect that his theory does contain a basis of novel fact. In the meantime there is a strong suspicion in our mind the other way. Dr. Vogel seems to us to have become in a sense colour-blind over this matter, and therefore to have grievously misread the simplest facts.

British Association.

BELFAST MEETING, 1874.

To a large number of the inhabitants of England Ireland is more thoroughly a *terra incognita* than even the European continent; and this being the case the meeting of the British Association during the past and present week has had a beneficial tendency, not merely in making the visitors acquainted in some small degree with a country of much beauty and interest, but through such passing and almost cursory acquaintance to sow seeds tending to germinate into a closer intimacy with the Green Isle; for we have heard several members of the Association express their determination to return and pay a second visit of longer duration, accompanied by other members of their household. There are in Ireland features of exceptional beauty; and it is a source of wonder that the annual tide of tourists which sets in towards Switzerland and the Rhine districts cannot be diverted towards the "emerald isle." Pending the advent of the fashion for travel in the sister country similar to that which prompts the taste for the Trossachs and far northern districts of Scotland, we feel assured that the recent visit of the British Association will greatly conduce towards considerably adding to the small fund of knowledge hitherto possessed in England with regard to the beauties of the kingdom allied to Great Britain by, at least, ties of kindred and friendship.

To the photographer Ireland is replete with "subjects." The view presented to those possessing an eye for the picturesque in visiting Ireland for the first time *viâ* Holyhead and Greenore was very charming. While the boat was as yet distant two or three miles from its destination the mountains of the County Down, with their fantastic outlines, were seen stretching along the coast on the right, approaching the shore by a gentle slope studded with pretty residences radiant in their coats of white, which were "resolved" by the telescope into small farms, the dimensions of which seemed greatly inferior to those we are familiar with in England.

Nearing Greenore, we enter an arm of the sea, and meet with shoals of fishing-boats. After passing what seems a ruined castle, and scenes of inexpressible loveliness, lighted up by the bright morning sun, and not a breath of wind to ruffle the water, we eventually disembark and enter a train waiting to start for Belfast, which is about forty miles distant, and the route to which lies through an undulating country, thickly dotted over with tiny whitewashed farmhouses and little farms, similar to those which arrested the eye when nearing the land.

Belfast, the place of meeting of the British Association, may, with too much truth, be said to be the only manufacturing town in Ireland. It is the great centre of the linen trade, and at every turn one meets with evidences of its commercial prosperity. But at the time of the meeting of the "Parliament of Science" a dark cloud was hanging over it. One of those great "strikes" to which our manufacturing districts are susceptible had, unhappily, settled down upon Belfast, and which apparently could not be removed, despite the efforts of both employers and employed; consequently during the Association week the numerous mills which fringe the outskirts of Belfast lay idle, and thousands of unemployed factory operatives were to be seen throughout the town waiting anxiously the efforts of those who were engaged in trying to effect an arrangement acceptable to both parties. Topographically, Belfast possesses fine streets and squares, large warehouses, shipbuilding yards and sheds, and altogether presents the aspect of a substantial, thriving, and well-to-do city. Although the majority of its inhabitants are Irish it has, undoubtedly, received a large access of population from England and Scotland—some say to the extent of fifty per cent.; and from this cause, probably, arises the fact that, as respects religious denominations, the Protestant population is greatly in excess of the Roman Catholic. Among the lower classes a feeling of religious party spirit runs very high, and it was during the week of the meeting of the British Association in Brighton, two years ago, that the newspapers were teeming with the fearful party riots which took place in Belfast, in which whole streets were kept in a state of siege. Almost surrounded by hills, the atmosphere is so mild and genial that many invalids seek it in preference even to the most favoured spots in Devonshire. We have said that Belfast is the seat of the linen trade. That the business done must be indeed very great may be ascertained from the numerous mills, one of which, it is said, employs, directly and indirectly, twenty-five thousand persons, and from the further fact that one hundred thousand pounds per annum is spent in the ornamental wrappers in which linen goods are packed to be sent abroad.

Such was the town in which the British Association for the Advancement of Science held its recent meeting, under the presidency of Professor Tyndall, the popular lecturer of the Royal Institution. The meeting was well attended, the number of members and associates present being very close upon 2000. Queen's College, a large and commodious building on the southern outskirts, furnished a convenient home for most of the sections of the Association, as well as a reception room not in any respect inferior to those provided on such occasions in other places.

From the well-known skill and ability of Professor Tyndall in treating of subjects connected with light and its several components, we had fully calculated that his opening address would have been strongly impregnated with topics of the highest interest to the photographer; but in this we were greatly disappointed, for that subject appeared to have been almost ignored.

In the course of the opening address of Major Wilson, R.E., President of the Geographical Section, on Thursday that gentleman spoke of contributions to geographical science originating in topographical surveys. "The progress of European surveys, and especially of our own," he said, "has been marked by many results which have indirectly influenced the advancement of geographical science, such as the improvements in instruments made during the progress of the triangulation, the introduction of the Drummond light, Colby's compensating bars, &c.; the connection of the English and continental systems of triangulation; the pendulum observations at various places; the measurement of arcs of the meridian; the comparison of the standards of length of foreign countries—of India, Australia, and the Cape of Good Hope—with our standard yard, which has recently been completed at the Ordnance Survey Office, Southampton. In the same category may be placed the improvements in the art of map-engraving; in the application of chromolithography to the production of maps, as exemplified in the Dutch process of Colonel Bessier and the Belgian maps; and the employment of electrotyping to obtain duplicates of the original plates. The method of copying maps by photography, without any error in scale or any distortion that can be detected by the most rigid examination, was first proved to be practicable, and was adopted in the Ordnance Survey Department in 1854, by Major-General Sir Henry James, for the purpose of facilitating the publication of the Government maps of the United Kingdom on the various scales. Since that date the necessity of rapidly producing, multiplying, enlarging, and reducing maps has tended towards the development of the various photographic processes which have been brought to such a high state of perfection. During the last five years photographic negatives on glass covering an area of 10,071 square feet were produced at the Ordnance Survey Office for map-making purposes alone, and from these negatives 21,760 square feet of silver prints were prepared and used in the various stages of the Survey. An area of 959 square feet of the negatives was also used in producing 13,595 maps on various scales by the photozincographic process, which was also introduced by Major-General Sir Henry James. It was by similar processes that the Germans were enabled to provide the enormous number of copies of the various sheets of the map of France required during the war of 1870-1. Any comparison of the maps of various countries would necessarily occupy much time, so I will only add that as specimens of engraving the sheets of our one-inch map are unrivalled, and that no foreign maps can compare for accuracy of detail and beauty of execution with the sheets of our six-inch survey. Our great national Survey is the most mathematically accurate in Europe, and it speaks much for the ability of the officers who have brought it to its present state of perfection that from the very first they recognised the necessity of extreme scientific accuracy in their work, and that they have never had to withdraw from the position they have taken up with regard to the many questions of detail which have arisen from time to time."

Among those who were present whose names are more or less known to our readers as interested in or connected with photography were Dr. J. Emerson Reynolds, Captain Abney, Messrs. Le Neve Foster, James Glaisher, A. L. Henderson, of London, A. Henderson, of Montreal, Howard Grubb, J. T. Taylor, R. C. Johnson, Lewis Hughes, Henry Greenwood, W. H. Harrison, Samuel Guppy, and others.

At a general meeting on Monday last it was decided that the next meeting should be held in Bristol, on the 25th of August, 1875, under the presidency of Sir John Hawkshaw, C.E., and it was further decided that the meeting for 1876 should be held at Glasgow.

As in former years we now present such papers bearing upon photography as were read.

SECTION A.

ON PHOTOGRAPHY IN RELATION TO THE TRANSIT OF VENUS.

By Capt. Abney, R.E., F.R.A.S., F.C.S.

As is doubtless well known to all, there will be an application of photography to register the passage of Venus across the sun's disc, and it may not be amiss to give an outline of the processes that will be adopted.

It has been determined by the Astronomer-Royal that at each photographic station a photograph shall be taken every ten minutes during the transit, and it has been a matter of considerable labour to work out a process that will admit of such a large number of negatives being taken in a hot climate. In Kerguelin's Land it would be perfectly feasible to adopt the ordinary wet process, the low temperature admitting of it; but in a temperature of 90° Fah. the evaporation of the volatile constituents of the collodion would render such a process inapplicable, as all practical photographers will admit. In India, where I have worked extensively, coating two or three plates in summer in a large-sized tent has sometimes proved injurious. With such experience I venture to think that it would have been madness to have trusted to the wet method for four hours, unless the conditions of *personnel* of the parties was considerably altered. Sir G. Airey, after much anxious deliberation, and with the advice (and that not hastily formed by any means) of Mr. Warren De la Rue, determined to adopt a dry process, if practicable. After considerable experiment, conducted at Chatham, it was determined to adopt a collodio-albumen dry process, using a highly-bromised collodion and strong alkaline development.

There were several advantages in this—First, at the critical time the photographers would have nothing to distract their attention excepting placing the dry plates in the slide and developing every twelfth plate exposed in order to regulate the exposure; second, the irradiation was much diminished by the use of albumen—a point of no small importance when measurements have to be taken; third, the shrinkage of the film is reduced to zero when the plates are properly prepared.

In regard to the first advantage claimed, it will be apparent that plates prepared at leisure will be superior to those prepared in the hurry of the moment, as would be the case with wet plates. The chances of stains and spots are diminished tenfold, and one may expect a much cleaner picture.

The true explanation of irradiation has been argued of late in *Nature*, and perhaps I may be pardoned for dwelling an instant on that point. Irradiation may be divided into two kinds, viz., that occurring from reflection from the back of the plate, and that occurring from reflection from the particles of bromide or iodide of silver in the collodion film.

The first requires no explanation. If a film be sufficiently dense and of such a colour as will cut off the most actinic rays of the spectrum no irradiation on that account need be anticipated. Iodide of silver fulfils this condition much more fully than does bromide of silver, the former approaching to a yellow colour, whilst the latter is almost white. A thin layer of iodide is much more efficient in cutting off the blue end of the spectrum than is the bromide; hence, if irradiation through reflection from the back of the plate is to be overcome, it is wise to use a certain proportion of iodide in the collodion. Practically I have found that in the dry process under consideration three parts of iodide and two of bromide give the best results without deminishing the sensitiveness of the film.

The second cause of irradiation, viz., reflection from the particles of bromide and iodide, is not hard to explain. When a colloid body, such as gelatine or albumen, is brought in contact with a soluble salt of silver, the resulting compound is found to be one which is singularly free from this defect. If a ray of light be allowed to fall at a right angle upon a very thin cell containing an emulsion of bromide of silver, the cell having worked-glass sides and ends, it will be found that the ray of light will be scattered considerably, apparently in a logarithmic curve; the surface nearest the source of light will not be affected, but it will spread from that surface towards the other, a physical line of light becoming an area. If, however, a colloidal salt of silver be introduced it will be found that this area is much diminished, and for small distances becomes inappreciable. In connection with this I may mention that bromide plates, even when backed with a non-actinic backing in optical contact with the plate, will give irradiation with alkaline development, while with acid development the irradiation will disappear. The explanation is not far to seek. The alkaline developer reduces the silver *in situ;* the acid developer deposits silver on the surface and where there is most attractive force. In the former case the dispersed light acting on the interior of the silver causes the necessary change in the bromide of silver, and effects reduction. Daguerreotype plates are not free from irradiation, as has been supposed, although, owing to the extraordinary thinness of the iodide of silver, but little effect can be traced unless a very prolonged exposure be given.

In the dry process selected for the transit of Venus it has, then, been thought desirable to have a rather dense film containing a proportion of iodide of silver, and a colloid body—albumen—as preservative. I am not unmindful of the fact that different pyroxylines more or less affect irradiation, and I have altered the constitution of the pyroxyline in the collodion we shall use by adding certain proportions of water. This materially aids the annihilation of irradiation from these plates.

For registering the time of external and internal contact of the planet with the sun's disc the method known as "Janssen's" has been adopted, viz., causing a fresh portion of a plate to be exposed every second during the critical time to the sun's limb at that part where the contact will take place. Mr. Christie and Mr. De le Rue have both devised a slide for this purpose. The English parties use that designed by the former, whilst Colonel Tennant will use that by the latter.

Shrinkage in the film has been carefully looked for by Dr. Vogel, of Berlin, and also in this country by Colonel Stuart Wortley and myself. Photographing a grating of two hundred lines to the inch, by contact printing, and measuring the results, I have been unable to find any alteration in the distances of the lines at any part of the film; hence I feel confident that any shrinkage that can take place will be so small as to be negligible. The Russian parties are, I believe, going to use a grating material of cross wires. If shrinkage did occur this would be necessary, but it seems almost useless—in fact, hurtful, when there will be none. There must be a certain error introduced due to the grating itself. The method of finding the angle of position of the wires will be determined photographically. Two pictures of the sun will be taken at an interval of one minute on the same plate. The line joining the intersection of the sun's images will give the angle of position of the wires when measured by the micrometer.

At each station the photographic party will consist of one officer and three sappers, all of whom have been trained in the use of the photoheliograph and the process employed. A drill for each operation has been devised, and it is anticipated that the dangers of excitement during the critical time have been overcome by this arrangement. Practice on a mock transit has ensured a thorough knowledge of each phase of the phenomenon, and I apprehend that discipline, combined with a trust in their superiors, will have annihilated one source of failure.

Mr. Glaisher could not forbear remarking how much the parties owed to Captain Abney, whose process it was that was in effect adopted, and who had trained the different officers who would have charge of the photographing at the different stations. Till Captain Abney gave his assistance nothing satisfactory had been done.

PHOTOGRAPHY IN CONNECTION WITH ASTRONOMY.

By Colonel Stuart Wortley.

Having been asked by the Astronomer-Royal for some information in connection with photographic processes with a view to their being used for the transit of Venus, and having had the advantage of discussion of the various processes with my friend Captain Abney, who has been in charge of the transit photographic work, I made at various times during the past summer a number of experiments in solar photography, the result of which may possibly be of use to future workers in this branch of science.

Taking the ordinary commercial collodions manufactured for photographic processes we are at once struck with the difficulty of getting accurate micrometrical measurements, in consequence of the varying amount of contraction and expansion possessed by the collodion film in its wet and dry states. To counteract this difficulty it is necessary to make the pyroxyline with the maximum of water added to the acids, which they will bear without dissolving the cotton when immersed therein; and it is also desirable to reduce considerably the proportion of nitric acid to sulphuric, with the object of obtaining a film which shall neither contract or expand when either wet or dry. By using such a pyroxyline I have been enabled to make a film on which the most delicate micrometrical measurements can be registered with absolute perfection.

The next point to be considered in connection with astronomical photography is the radiation and halation produced where the bright and dark parts of the picture meet. This appears to proceed from two different causes—one, which we may call "halation," being the reflection of light back from the glass which supports the film into the film itself; and the other, which I will call "radiation," and which appears to be an action in the sensitive molecules of the film itself, and occurring no matter on what support the film may be laid. Halation from the first of these two causes can be prevented in two ways—one method being to place a dark pigment on the back of the glass plate, and in optical contact therewith; and the other, and far preferable one, to stain or dye the film itself with such an amount of orange or red colour as shall stop the rays of light from getting down to the glass and being thence reflected.

But the radiation which takes place in the film itself is much more difficult to subdue, cannot be subdued by mechanical means, and can only be subdued by the use of certain chemicals in the film, differing somewhat from those in use in the ordinary photographic processes.

Before pointing out what I consider the best means of avoiding this injurious halation I will point out what I consider it to be, and why I consider it to be so. I think the radiation in photographic films, which is so unpleasantly apparent when a bright object is photographed in close proximity to a dark one, is due to what I may call a "creeping" of the superabundant light, which has done its work on the bright object, over and into the darker portions of the picture. To illustrate this argument the following fact in connection with dry-plate photography should be borne in mind:—If a landscape photograph consisting of trees and sky be taken in a bright and actinic light, and when a short exposure is, therefore, only necessary, there will be on a rapid dry plate but little radiation; but if the same view be taken in a dull light, and when the actinism is infinitely less, the longer exposure required will certainly produce a great amount of radiation from the sky over the trees; now the sky, even in a dull light, would be impressed on the film tolerably rapidly, and the necessity for the long exposure is in order to get the detail in the darker parts of the picture, and the radiation is thus produced by the creeping of the superabundance of light that has already finished its work on the sky over the dark parts of the picture, which require the prolonged exposure. That this "creeping of the light" does take place, the following experiment will, I think, show with certainty:—

In order to find out which of the salts of silver were least liable to give this radiation I have experimented with a very large number of them, to which I will presently allude; and the following singular fact was discovered by me in connection with the chloride of silver, which salt has much more tendency to give radiation than any other that I have experimented with:—I had found that a sensitive film which contained a chloride was always possessed of less satisfactory keeping qualities than one from which chloride was absent; and in course of some experiments on the various keeping qualities of plates between exposure and development I came across the following singular fact:—A dry film containing a considerable quantity of chloride was after exposure cut in half—one half developed immediately, and the other half put away in the dark for forty-eight hours. It was found that on the half of the plate that had been kept in the dark for forty-eight hours the "blurring," as it is called by photographers, was considerably greater than on the half plate that was developed at once; and on repeating the experiment several times I was enabled to convince myself that the action of radiation, or what I have called the "creeping of light," on to the dark parts of the picture continues after the film has been removed from the action of the light, and after it has been put away in the dark. I have noticed this with chloride of silver only, but I was thus led to investigate the behaviour of other salts of silver in connection with this radiation of light.

No photographic process gives such good and rapid dry plates as the one in which an emulsion is made of bromide of silver formed in the presence of a large excess of the nitrate of the metal; but when we use the bromide alone it is unfortunately strongly addicted to the blurring before spoken of. We can, however, entirely counteract this tendency by the use of other salts of silver. I will not take up your time by going into very minute details on this point, but will merely say that I have found that the addition either of the malate, succinate, fluoride, or iodide of silver to the bromide will, if used in the proper proportion, give a sensitive film from which radiation shall be entirely absent, and that their suitability to the purpose is found in the order in which I have written their names; and with a film containing a large proportion of malate of silver I have been enabled to take subjects which it would be impossible to take by any other method, owing to their strong contrasts of black and white. It should also be noticed that these salts have a peculiar effect on the colour of the finished negative—the malate giving a golden brown, the succinate a red brown, the fluoride a pink, and the iodide a delicate green. It is also a great preventive of radiation to add nitrate of uranium to the emulsion, and whatever other salts are used this should never be omitted. I may also mention here that I have found these various salts to act in a remarkable manner in connection with the colours of the spectrum, and to give peculiar results in connection with some of the more difficult lines thereof.

There is one final point as to the obtaining of good astronomical photographs. It appears to me to be essential that they should be developed by the strong alkaline method of development, which was introduced by myself in the course of last year. It is impossible with the old method of development to obtain results in any way as satisfactory as those obtained by my new method. Not only is there a very great increase of sensitiveness obtained, but the development is unusually certain and rapid, and where the sun has to be photographed it has a peculiar effect in giving the outer limb clear and sharp. Captain Abney has, after many experiments, decided on using my method of development for the dry plates used at the transit of Venus; the formula being a saturated solution of carbonate of ammonia with sufficient pyrogallic acid, and bromide of potassium if required.

No discussion followed the reading of this paper.

THE PHOTOGRAPHING OF THE MOON.

The Earl of Rosse, F.R.S., exhibited a large photograph of the moon, which, he said, had been lent to him by his friend, Mr. Warren De la Rue, who had had much to do with the construction of the great reflector of the Melbourne telescope, with which the picture was taken. Although the great telescope at Melbourne had been in use for some time, it was the first really successful photograph of the moon which had been taken with it, partly because the reflector had been used for other work, and partly because the nights on which good lunar photography is possible are so very few. Currents of air of different densities were usually moving in large volumes one above the other, and these so refracted the rays of light as to cause the stars to appear to the eye to twinkle, and to cast unsteady images of the different parts of the moon when the reflector was used in the attempt to obtain photographs. Hence not only must the sky be clear, but the air very still at all elevations, before good lunar pictures can be obtained; so it was not surprising that in the short period which elapsed after the reflector was made and before it left Dublin no good photographs were taken. Before the advent of the photograph he was then exhibiting, the best that had ever been taken had been obtained by Mr. Rutherfurd, of New York, who used a refractor for the purpose; the lens had been made specially for the work, and had been ground to bring the blue and violet rays of the spectrum to a sharp focus on the sensitive plate, since these rays, and not those which are most luminous to the eye, are those which exert an influence over the chemical substances contained in photographic films. Mr. De la Rue had taken many beautiful photographs of the moon, at his observatory at Cranford, and was noted for his skill in the work; but he believed that Mr. De la Rue was of opinion that Mr. Rutherfurd had obtained a better photograph of the moon than himself, the atmospheric conditions chancing to be so good on one particular night. Although Mr. Rutherfurd had obtained his good picture so far back as 1865, he had never been able to obtain another to equal it since; therefore the single picture did not prove that a refractor was better than a reflector for lunar photographic work, but simply that atmospheric conditions were exceptionally good on a particular evening. He had carefully compared Mr. Rutherfurd's picture—of which he possessed a copy—with the one taken with the Melbourne reflector, and thought that the latter was slightly the better of the two. He could not, however, speak with certainty, and should like to have the aid of good photographic critics. Both pictures had been enlarged from the original negatives, and Mr. Rutherfurd's had been much more enlarged than the other. The original negative taken with the Melbourne reflector was about three and a-half inches in diameter. The phase of the moon was nearly the same in both pictures.

Mr. Glaisher said that Mr. Rutherfurd had recently taken a photograph of the moon nearly as good as the celebrated one which he took nine years ago. He knew this, because Mr. Rutherfurd had recently sent him a copy of the last one.

Professor Jellett said that after the great reflector first reached Melbourne some unfavourable remarks were made about it, but the results before them showed that it was a good instrument. He was glad to say that that admirable telescope had been made in Ireland. (Applause.)

SECTION E.

ON THE MULTIPLICATION OF MAPS AND PLANS IN THE FIELD.

By Capt. Abney, R.E., F.R.A.S., F.C.S.

Our President has already remarked on the necessity of a military man knowing geography. I venture to think that topography is even more necessary. A very little thought will convince those of my hearers who have not hitherto considered the subject that the more perfectly the officer commanding an army in the field knows the ground on which he is about to give battle to the enemy the greater his chance, if not of securing victory, of at least making the best fight possible.

I will not take up time by enumerating instances; even recent autumn manœuvre experiences may possibly occur to some of you. How, for instance, the Prince of Wales, on the point of being taken prisoner, escaped by an intricate pathway across a bog over which his enemy was afraid to follow him; and you can understand how a deep, unknown ditch may foil a charge of cavalry; in short, how in a hundred ways a good knowledge of the country is desirable, not only for the general in command, but for all the officers under him. Now this knowledge can, in but the very rarest instances, be what is called "personal" knowledge; and though it may happen that there is one officer in an army who is well acquainted with the field of battle, it is absolutely certain that but very few will possess that knowledge, and they probably will not be the men who are best able to make use of it.

But if every officer can understand a map, and if a special map be made of the part of the country required to be known, and if this map can be multiplied so rapidly that within a few hours after it has been completed a clear and intelligible copy can be put into every officer's hands, then we get as near as possible to the condition of perfect local knowledge throughout the army. And here I would remark that, though maps of civilised countries can be obtained more or less accurate, yet they are necessarily on a very small scale, and a map, however good, on the scale of ten miles to an inch, cannot possibly show, for instance, such a wall as helped us to win the battle of Meance.

The Prussians, with that forethought which so entirely distinguishes their War Office, went to war with France thoroughly prepared, with maps revised to the latest moment—so, at least, it is said; and it is not known whether they had to resort on any large scale to the operations of what we term "*reconnaissances*," but they invariably made the officer in charge of any post map out roughly the country close round it, as a guide to the generals, in regard to local details. I will, however, exhibit a piece of *reconnaissance*, such as the officers of the Royal Engineers are taught to make; and when I tell you that we have at present in the army systems by which this kind of work can be multiplied at the rate of 100 an hour in the field, you will see that at least we have made some advance since the time when the officers of the Engineers were kept up all night, copying by hand the rough sketch, almost from memory, which guided Sir Colin Campbell into Lucknow at his relief; or, again, since the time when the Duke of Wellington was able to take his army across the stream which runs past Tarego, from a sketch taken by an Engineer officer while at full gallop. In the hope that a more precise description of the method employed may be interesting this paper has been written. And here I may say that the duty of multiplication of maps has been placed in the hands of the Royal Engineers, as the professional training of the officers is such as gives them more practical knowledge in the methods employed. The sappers under them also for this particular purpose are men whose trade is that of lithography or photography.

In order to reproduce plans without the aid of light it is evident that but two methods are open—the plan must be drawn either in copying-ink, or in an ink suitable for transfer to stone or zinc. The first plan is inadmissible, as it is almost impossible to get more than six copies from the original. The other method is that which has hitherto appeared most practicable. Those who are familiar with the subject of lithography and zincography will know that any subject meant to be reproduced must be drawn in a particular kind of greasy ink on a paper specially prepared for it, and that the greatest caution is required to prevent the transfer, with the drawing, of marks caused by hot fingers touching the paper. The prepared paper is also spoiled by moisture. The ink is generally in an inconvenient form, requiring rubbing up with water before being used. Evidently, then, there was a difficulty in the way. I had happened to direct my attention to the subject for other purposes besides that indicated, and after various experiments I had the good fortune to make an ink, not greasy, but yet capable of being transferred to stone or zinc. It was also unnecessary to use the prepared paper, the subject readily going down from the ordinary kind. This had important bearings, as it was immaterial if the fingers touched the paper, as the greasy markings from them could be destroyed before transferring it to the stone.

The colour of the ink, which was my great difficulty, is black, and after transfers are taken from it the original remains nearly unharmed. It has been adopted into the service for field work, as, indeed, it has for the depôt at Chatham and in the Surveyor-General of India's office. I exhibit some results from a *reconnaissance* done in the field with it. All that is necessary in using it is to keep india-rubber from the paper. If this be attended to it will go down cleanly and well to the stone or zinc. The stone or zinc plate is slightly warmed, the grease destroyed by an alkali, and, when damp, it is placed on the one or other, and passed through the press, when it will be found, in rolling upon the impression, that an exact *facsimile* of the sketch is produced. Three transfers can be taken from the same sketch, and within one hour from the time of receipt of a drawing fifty copies can be issued. It has not been deemed advisable to adopt any other process but this in the field, though, doubtless, improvements in the method will be developed, and render reproduction still more easy.

The next branch to which I wish to call your attention is that of reproduction by means of photography. It frequently happens that one plan of a district may have been obtained, and it may be necessary to reproduce it on a larger or on the same scale.

It should be remarked that enlargements from an accurate map—say from the one-inch scale to the six-inch scale—are often most useful, enabling the reconnoitering parties to put in details without absolutely resurveying the ground. As a rule, a negative is taken by the ordinary processes, and, if only three or four copies be required, prints are made on common salted paper or on linen, a supply of both being taken in the field. Preferably one would use the former, and mount it on the latter. When over half-a-dozen copies are required we use a species of photolithography. The method practised at Southampton was originally adopted, but it has again been our good fortune at Chatham to introduce a modification into the system which is easier to apply in the field. This I have called "papyrotypy."

The following is a brief description of Sir H. James's method:—Paper is coated with gelatine, and rendered sensitive to light by the addition of bichromate of potash. The action of light on this salted gelatine is to render it insoluble in, and also incapable of *absorbing*, water. Thus, if this sensitive paper be placed under a negative of which the black lines of the original are represented by transparent glass, and the whites of the paper by an opaque deposit of silver or silver and mercury, the lines printed on the gelatinised paper will become insoluble in any water, either hot or cold, whilst the white portions will absorb cold water, and actually dissolve away in hot. Up to this stage zincography and papyrotypy are alike. In the Southampton method the paper, after being printed upon by the action of light, is covered with a very fine layer of greasy and resinous ink. The back of the paper is next floated on hot water, thus penetrating to the gelatine, softening it, and rendering it liquid. It is then taken on to a flat, inclined surface, and by the aid of warm water the soluble parts are all sponged away, carrying with them the ink that covered them, and leaving the lines represented by black ink in minute ridges of gelatine. Evidently now we have a drawing in greasy ink ready to be transferred to stone or zinc.

In papyrotypy the paper, after being taken from the printing-frame, is immersed in cold water at once, thus stopping nearly all further action of light, for bichromated gelatine is only *slightly* sensitive when wet. It is blotted with blotting-paper to get rid of surface moisture, and then a soft gelatine roller charged with greasy ink is passed over the surface. Now it must be borne in mind that where the light has acted there *alone* the gelatine does not absorb water, and, as water repels grease, the greasy ink will only take on those parts which have been acted upon by light; hence we have a *facsimile* of the original. Owing to the expansion of the gelatine when wet the copy is sometimes finer in detail than the original. The benefit of this plan in the field is that no hot water is requisite, and that after one transfer has been taken upon zinc or stone another can be rolled in on the paper and a fresh transfer made. Another point I lay stress upon is that the greasy ink is on the surface of the paper and not on ridges of gelatine. After transfer to zinc or stone as many copies as may be required can be pulled off at the rate of seventy or eighty an hour from one press. This process has been adopted, and is found to answer well for the purpose to which it is applied.

We next have to consider the multiplication of photographs. This is highly useful, as at long distances a photograph of an outwork, for instance, can be obtained, and by an ordinary enlarging process the details can be rendered visible without the aid of a telescope. It rarely happens, or could happen, that above thirty or forty copies of a photograph can be required. If only three or four be wanted the ordinary silver printing process on albumenised paper can be utilised. If more than this number, papyrotypy can be employed. In this case a reversed negative, taken by means of a prism of total reflection placed in front of the lens, is made use of, and the negative printed on the gelatinised paper.

As has been happily said—"gelatine acted upon by light has a discriminative power of absorption of water;" that is, just in proportion to the intensity of light acting upon it so is it incapable of absorbing water. And after absorbing water it has the same discriminative power of taking greasy ink. Now it will be apparent that after printing a half-tone negative on this paper, and after soaking it in water, it will have the power of taking lithographic ink from a roller with different degrees of intensity. When inked in this manner, and placed in a common printing-press, it is manifest that an impression giving gradations of light and shade can be obtained by bringing ordinary paper in contact with it. The ink having been taken up by the paper, the roller charged afresh with ink can be passed over the gelatine and more impressions pulled. Forty or fifty copies in this way can be obtained, and they are, of course, permanent, the picture being built up in printers' ink.

There is no novelty in this method. It is similar to the heliotype and other mechanical printing processes; but it has this advantage—that in the latter it is necessary to obtain a solid layer of gelatine on a glass plate. The layer is ready sensitised, by the addition of bichromate of potash, and contains resins to give it toughness, whilst the papyrotype paper can be kept in rolls of forty or fifty feet, and sufficient can be sensitised, by floating on a bichromate of potash solution, as may be required. In the field it would be hopeless to try to prepare gelatine films on glass, as they require room and considerable time to dry. Forty-eight hours is, at least, required before they can be printed from, and the least particle of dust on the surface is fatal to good printing. The sensitised gelatine film only keeps a limited time, varying from a week to a month; whereas the paper is always ready. For the field the papyrotype process answers the purpose required, and has been adopted by the Engineer authorities.

At Chatham for ordinary work—such as illustrations of reports—we use the heliotype process. A brief outline of it may be useful:—A glass plate is carefully levelled and a solution of gelatine, chrome alum, bichromate of potash, and milk is poured over it. This is allowed to set, after which it is raised up and allowed to dry, which, as before stated, takes about forty-eight hours. When dry the gelatine film (which is sensitive, owing to bichromate of potash) is stripped off; one side is hardened by exposure to the sun, and the other is then placed in contact with a negative. When it is judged that sufficient exposure has been given it is slightly damped, and made to adhere to a pewter or zinc plate. It is next immersed in water for a quarter of an hour to swell up those parts on which the light has not acted, and also to soak out the bichromate of potash. The gelatine print is then placed on the bed of an ordinary printing-press, and a soft roller charged with greasy ink passed over it. The prints are obtained in the same way as described for papyrotypy. For a depôt nothing could be better than this plan, and it has astonished me much that more book illustrations are not done by it. I produce a few samples of the work executed by this method.

The equipment for the field as regards photography consists of a wagon, of which I have a photograph here. It is a dark room in itself, and has all the usual "fitments" of such. It is furnished with four cameras—two to take 12 × 10 pictures, and two 8½ × 6½ and stereoscopic. Both the large cameras are of the bellows form, and expand to such a length that a plan can be enlarged to six times the scale. The battery of lenses is complete, ten being furnished of different focal lengths. They are all non-distorting, and give marginal straight lines. A complete outfit for the smaller cameras is likewise carried; that is, a dark tent carrying chemicals sufficient for three days' work. This requires two men to manipulate. With the smaller camera one man can carry thirty-six dry plates, and must work independently of the wagon, save in the matter of developing his pictures. The same wagon carries sufficient stores for a three months' campaign, every article necessary for the reproduction of plans and prints, as far as photography is concerned, being part of the outfit. The wagon is horsed by two horses, as a rule, though four are laid down for its transport in the field. The full complement of photographers is five, viz., one non-commissioned officer and four sappers; each of these must have passed through the photographic course at the School of Military Engineering, and have a thorough knowledge of photography in all branches, especially plan work.

The lithographic department is furnished with a wagon similar in all respects. It carries stores estimated to last three months. The size of the press is naturally limited, double foolscap being the size of stone which it will take. Stones are not much carried, some half-dozen being all that are thought necessary. It carries, however, three dozen zinc plates for zincography. Provision is made for night work, and, in consequence, it is estimated that two non-commissioned officers and four men would be the staff required for work.

The printing wagon for typography and papyrotype work in half-tone, is also of the same pattern, and is supplied similarly with three months' stores. Two compositors (sappers) and one non-commissioned officer are the authorised number of men attached for this duty.

The War-Office authorities have decided that each of these wagons shall be attached to the Telegraph Troop of Royal Engineers. Thus the whole branch of the intelligence department will be combined in one. As there will be one telegraph troop to each division of the army, it follows that every general commanding will be in an independent position as regards his collection and distribution of useful intelligence. Thus the telegraph troop will connect his division with headquarters by telegraph. They will multiply his plans, photograph any point which may be of interest or use during the operations, and print his orders for distribution to the subordinate commanding officers. This last point is one well worthy of attention. In old days, when each regiment had to copy out the general orders from one order book, it was often the small hours in the morning before a regiment knew what time it would have to start. This worry is one well known even in peace time to those who used to serve at Aldershot or in the earlier manœuvres. I need hardly point out the necessity that existed of remedying it as far as possible.

We also have a mountain photographic equipment, which can be carried on the backs of three mules, weighing in all about 300 pounds. The size of the plates that can be used for photographs is 12 × 10. There is everything in it for the reproduction of plans for papyrotype transfers; but as yet we have no mountain equipment for lithography, as there are certain difficulties in the way which are not quite overcome. We have, however, a mountain telegraph and typographical printing equipment. The latter, joined with photography, enables us to produce copies of plans by papyrotypy.

I am aware that this paper must to many have been most uninteresting; but I was induced to bring the subject before the meeting to show that our authorities at the War Office are not averse to modern improvements in the small details of warfare. Our national sentiment can hardly be called "military," and the civilian element is always ready to believe that the British army can do little beyond being capable of mere physical fighting. A military man is not always fairly treated by his neighbours, and an absolute embargo has of late been laid upon the use of his brains by the withdrawal of the right of patenting a useful discovery.

Major Hotchkiss (of Virginia) said that for for four years he had charge of the topographical department of the army in Northern Virginia, and more especially of Stonewall Jackson's corps. He employed photography in the field, as well as for multiplication of maps by copying. The great battle of Sharpsburg, in which some 200,000 men were engaged, turned upon a single outcrop of a limestone ridge only eighteen inches in height. A portion of the Confederate army found shelter under this ridge. They were thus protected from the fire of the other side, and the victory turned upon that fact. He thought maps generally too much neglected such geological features. In preparing his maps he had used coloured crayons.

The President (Major Wilson) said that the one-inch English map was prepared entirely for civil purposes, and had lost all military character. The maps of foreign countries, however, paid more attention to military requirements. Coloured crayons were much used by the Prussians, but had never been used in this country, though, no doubt, their introduction would be of considerable advantage. The operations of the Germans during the Franco-Prussian war spread over more than one hundred sheets of the map of France, and of each of these sheets an enormous number of copies had to be printed and distributed. When Paris was besieged the French armies in the provinces suffered considerably from a lack of maps, as all the plates were stored up in Paris. Microscopic copies were, however, sent out by pigeon post, and enlarged copies made and distributed.

SOIREES.

The usual *soirées* in connection with the Association were held on Thursday, the 20th instant, and on Tuesday last; but they were exceptionally devoid of photographic or even general scientific interest. A local printseller placed on the table several very fine photographic views taken in various parts of Ireland by Mr. Payne Jennings; and there was also exhibited an enlarged photograph of the moon taken by the Great Melbourne telescope.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The August outdoor meeting of this Society took place on Friday, the 21st instant, when, notwithstanding so many being at this season out of town, a considerable number met at the Waverley station at seven o'clock, and as several members joined the party at various wayside stations *en route*, fully the average number reached East Linton a little after eight o'clock, where, in Sharp's Railway Hotel, ample justice was done to a substantial breakfast.

A foundation being thus laid, and all necessary information as to the best route to the various places proposed to be visited having been obtained, the party started in suitable conveyances, determined to make the best of the day, which, photographically, was all that could be desired. The first point of interest was Hailes Castle—an interesting relic of ancient times, but not of much value to the photographer in search of the picturesque, and so only three cameras were brought to bear on it.

We need hardly say that those who did not photograph were not idle. Fun and frolic were the order of the day, and especially prominent were a few who seemed strong in punning powers. The first hit in that direction was made by Mr. Stenhouse, and, as it was very good, which is more than can be said of such attempts generally, we give our readers the benefit of it. The members were walking single file along a narrow pathway leading from the ruin, when he, slightly altering the name "Cameron," quoted in musical chant the line of the well-known song—"'Tis the march of the *camera* men."

The next halt was made at Whittinghame, the residence of Mr. Balfour—a grand old house standing in the midst of a gloriously-wooded landscape. Here a few pictures were taken, when it was declared time for luncheon, which was very much enjoyed under the grateful shade of some fine old trees, after which the order was given to proceed to Biel House, one of the residences of Mr. Nesbit Hamilton, and, in the opinion of the leader of the party, the best "bit" in the route.

On the way the party came in sight of a neat tiled cottage close beside a quaint old bridge, and at the end of a charmingly-situated and beautifully-kept garden; what, however, attracted their attention was, not the house or garden, but a large glass house at the opposite end of the garden, bearing unmistakable evidence of having been built for photographic purposes. Why a photographer should settle down in a locality miles from even the smallest village, and almost as much from his nearest neighbour, was a puzzle which they at once resolved to solve, and so the two Secretaries were despatched as a deputation. The place they found was called Lint Mills, and the owner was a Mr. Nisbet, who, according to the evidence of a pretty-looking young woman, the only person about the place, "did a very good trade amongst the people round about." Mr. Nisbet himself was from home, but she produced the key, and asked them to go and look at the studio and pictures. Both were in their way first-rate—the latter quite equal to the average productions of his brethren of even the largest cities. The girl, apparently proud of her uncle's abilities, then invited them to examine his workshop, where they found that he combined the profession of carver in wood with that of photographer; and although there were no specimens of his work in this department to be seen, there were a number of drawings from which carvings had been made which showed that Mr. Nisbet is undoubtedly a man of genius, who enjoys the quiet of a country life, and who possesses the ability to make it pay.

Biel House was reached shortly afterwards, and here the first hitch occurred. The family were from home, the factor was in Haddington, and the gardener, the only other man who could give permission to visit the house and grounds, was away at a funeral. It was, however, quietly hinted that the doors and gates were open, and that "there is naebody at hame tae hender ye tae *tak* leave." The hint was of course taken, and the party were well rewarded for their courage. Biel House is really one of the most lovely places in Scotland, and admirably adapted for the work of the camera, including, as it does, a fine old house in the middle of a magnificent fancy garden, surrounded by a densely-wooded park, through which runs a fine stream spanned by several bridges. In front of the house stands, undoubtedly, the largest and, probably, the oldest cedar in the country, it having been planted in commemoration of the union between England and Scotland. All cameras were soon at work, and kept at it till every plate was exposed, and still it was by one consent agreed that the work had not been half done. Every turn of the road brought some new beauty into view, and made the tourists wish that they had counted their plates by tens instead of units.

At five o'clock the signal was given to constitute an ordinary meeting of the Society, and the President took the *chair* on the top of Biel bridge. The minutes of the previous meeting were held as read, and Messrs. J. Thompson and Casimir Roques were admitted ordinary members.

This constituting all the business the meeting was adjourned, and the party drove off on their homeward journey towards East Linton. Here they finished up with the usual dinner, and were just in time to catch the last train for Edinburgh, which they reached at half-past eight o'clock, highly delighted with the proceedings of the day.

Correspondence.

Progress of Photopolychromy.—Leaving Redon.—Unsolved Problems.—A Scene of Beauty.

M. Leon Vidal very kindly keeps me informed of the progress which he is daily making in photopolychromy, and in a letter just received from him he sends me two fresh specimens, which I enclose herewith for our Editors to see, and exhibit if they choose. M. Vidal tells me that the subject of the picture by Carl Muller, to which I alluded in a recent letter, is the *Miracle of the Roses*. The heroine is Ste. Elizabeth of Hungary, who is taking some bread to the poor on a cold winter's day. The King, her husband, on examining the basket, finds the bread converted into roses. There may be some amongst my readers who may probably feel regret that artistic talent of a high order should be wasted upon such subjects, particularly when the world of fact, in which we have all, perforce, a common belief, offers so many charming subjects for the pencil.

But this world of fact is, by the way, a world of changes. What are the lives of most of us but a succession of views in a phantasmagoria? A fortnight ago I told my readers that I was back again in my old Brittany home; now I have to tell them that I am about to leave it for ever, and that this is the last letter which I shall probably ever address to them from Redon. After seven years spent amongst the vines and chesnut groves, the winding rivers and breezy moors, the cromlechs and old churches, the *chateaux* and picturesque costumes of Brittany, I am about to leave it for a home by the ocean wave, and within sight of the finest mountains in North Wales. Here I hope to turn over a new leaf in photographic experimenting, and see what can be done with sea and sky, and instantaneous subjects generally, with new processes and appliances. My dark room will be within a few yards of the fine beach of Cardigan Bay, and I shall have an opportunity there which I have never yet had of working in this new direction. But although I shall cease to be French correspondent of this Journal, yet, from my continued connection with the *Moniteur* and my regular correspondence with a large circle of French photographers—and I hope a yearly visit to their gay capital—my future communications will not be altogether barren of French gossip.

There still remains a multitude of practical problems to work out in landscape photography, of which a mere catalogue would fill a column of this Journal. If, with no other hobby on my hands than this particular branch of our beloved art, I am able to contribute in ever so small a degree to the solution of any one of them, I shall feel rewarded for whatever trouble my experiments may have cost me. But my whole stock of photographic appliances is just now tossing about in the Bay of Biscay, on its way to Cardiff, in the good ship "*Cœur de Marie.*" Pray for its safety; for much of it could never be replaced by me if it should come to grief. Adieu, then, to *La Belle France*, and may we meet again next week on English soil, in our new relationship.

Redon, August 15, 1874. THOMAS SUTTON, B.A.

P.S.—I have just taken a last walk—yes, the very last in all human probability—along fields and footpaths where I have spent some of the happiest moments of what has been, thus far, a singularly happy life. There is an undefinable sadness which creeps over one in taking for the last time a favourite walk, and in saying adieu for ever to objects which have been familiar to one's eye for years. A week hence, and with what interest my photographs of these familiar objects will become invested! How glad I shall be then to possess them! The day is a lovely one—cloud and sunshine alternating, and the heat toned down by a cool south sea breeze—just the day for a farewell walk. How calm and beautiful is the landscape! The vines all around are loaded with clusters of fruit just beginning to ripen; the chesnuts, with their pointed leaves, are weighed down by the promise of a heavy crop; the figs are ready to drop into one's mouth; the apple trees are bowed to the ground with fruit; the distances, dotted with church spires and farm houses, are of all shades of grey and purple, and the summer clouds hover over them in great lazy masses. In the foreground the fields are white with buck wheat, now in full bloom; the hill tops are covered with forests of dark pine; and the civil peasants are in their cool, shady cottage rooms, over their *gallette* and cider, for it is the time of the midday repast. What an exquisite solitude! What a scene of beauty to quit for ever! Why does a resistless fate forbid one to linger?—T. S.

ETHYLIC IODIDE AND BROMIDE.

To the EDITORS.

GENTLEMEN,—In your last issue Mr. W. E. Batho makes a suggestion as to the employment of ethylic iodide and bromide as substitutes for the ordinary iodides and bromides employed in photography, and asks if the formation of ethylic nitrate in the bath would be the result of dipping a plate coated with collodion so prepared.

The first obstacle which presents itself in opposition to this result is the fact that ethylic nitrate is one of the most difficult to prepare of all the compound ethers, the *nitrite* being the inevitable product of the action of nitric acid upon alcohol unless a special course be adopted for the purpose of preventing the deoxidation of the acid during the process. A more serious impediment to the employment of these substances exists, however. I, too, have been led away by the delusive hope which the use of ethylic bromide held out of producing an emulsion free from all insoluble matter except bromide of silver.

Before putting my intended experiments into operation I had plenty of time to fully study the matter in consequence of the difficulty I experienced in obtaining the substance required, and in the course of my reading I discovered the discouraging fact that ethylic *chloride is unacted upon by solution of silver nitrate.* The greater affinity for silver possessed by both iodine and bromine might alter the case with regard to the *quasi* salts Mr. Batho proposes to use; but, considering the similar properties possessed by the halogens in all their combinations, I think the weight of evidence is in favour of a negative result. The effect of dipping a plate coated with collodion containing only ethylic iodide and bromide would be, I apprehend, simply *nil.*—I am, yours, &c.,

Liverpool, August 25, 1874. W. B. BOLTON.

ANSWERS TO CORRESPONDENTS.

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

A. M. BEER.—See reply to "J. S. Hailes."

MYSOTIS.—We have not yet returned to London.

D. G.—The apparatus still remains *in statu quo.* The change of address is noted.

T. W. B.—Send us a sample of the fibre to be photographed, and we shall then advise you with respect to the best way of having it done.

AN OLD ULVERSTON BATH—in giving a portion of its autobiography—speaks of the advantage it has derived from a small dose of solution of nitrate of barytes when it was "out of sorts."

HYGROS.—The best way of ascertaining the degree of moisture in the atmosphere is by the wet and dry bulb thermometer, details of which will be found in a former volume of this Journal.

J. S. HAILES.—The book is not sold in this country, so far as we can learn. We shall publish extracts. We do not know if it be easy to obtain any of M. Silvy's specimens; but, as he took a great number of photographs, it ought not to be difficult to, at least, see some of them.

D. SCOTT.—1. Some of the specimens are very excellent. Instead of increasing the slope of the side of the roof, we imagine that your purpose will be better attained by erecting a board on the roof by which to prevent the rays from striking upon the glass.—2. We should prefer the collodion emulsion for the large plates. If you prepare it yourself, see and use such a proportion of alcohol as will prevent it from setting too rapidly.

D. S. N.—Judson's colours are admirably adapted for staining collodion films. Proceed as follows:—Give the plate a preliminary coating of diluted albumen, then apply plain collodion of a strong and tough description. When the film has set, but previous to its being quite dried, immerse in water till greasiness has disappeared; after which apply the dye that is intended to be employed, having previously diluted it with a little water.

F. J. W.—1. Write to Mr. Mawdsley, of the Liverpool Dry Plate Company. —2. See answer to "J. S. Hailes," in the present number.—3. The materials for practising the "dusting-on" process, either of enamelling or reproducing negatives, may be obtained from Mr. Solomon, and probably also from other dealers in photographic materials. We are always glad to be "bothered" by such correspondents as you prove to be—that is, those who make known their requirements in a terse and intelligible manner.

J. L. THORBURN.—We think the best way to make the film more "creamy" will be to increase the proportion of cotton—more especially as you state that your emulsion is very fluid. It is not advisable to have the film so transparent as we imagine, from the description, yours to be. When a preservative is used the plate ought never to be washed after its application unless special directions are given to that effect. When a plate is washed before being immersed in the preservative, the preservative may be used over and over again.

T. J. F.—1. To obtain a negative under the conditions mentioned, prepare a dry plate by means of any process that will yield great intensity, and upon this place, in close contact, the paper covered with writing, and expose. After development remove the film from the plate, and replace it in a reversed condition.—2. Not having the volume at hand at present for reference we are unable to compare the process of heliotyphic printing there described with that you have tried; hence we are unable to say why you have failed to succeed.

J. N.—It will be somewhat difficult to give you advice that will prove valuable unless you send us silver prints from the negatives, for upon the nature of the drawing will very much depend the process we should recommend as that best adapted for reproducing them. If the illustrations are to be of a similar kind to those in the most recent treatises on animal physiology, especially if similar to one in the illustrating of which we were consulted a few years ago, we should advise you to make surface blocks by means of one or other of the methods we have described in previous volumes of this Journal. Surface blocks possess this great advantage over other methods of illustration—they are inserted among, and printed at the same time as, the typographical matter.

RECEIVED.—Communications from Cañon Beechey, Mr. W. E. Batho, C. H. Full, and several other correspondents. Will have attention in our next.

METEOROLOGICAL REPORT,

For the Week ending August 26, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
20	30·47	E	61	64	81	54	Dull
21	30·54	E	60	63	75	56	Dull
22	30·56	E	54	57	74	57	Fine
24	30·40	NE	52	56	73	47	Fine
25	30·15	W	55	59	76	51	Dull
26	30·18	E	53	56	—	49	Foggy

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 748. Vol. XXI.—SEPTEMBER 4, 1874.

FIRES AT PHOTOGRAPHIC ESTABLISHMENTS.

Photographic premises are subjected to more than the usual average of disasters. Erected for the most part on the roofs of houses, studios woo the thunderbolt; covered with glass, they break rather than bend under a hailstorm; despite the utmost effort of mechanical skill in their erection they are too often found to be non-waterproof during heavy rain; but constructed, as they generally are, of wood they are in an especial manner amenable to the ravages of the devouring element.

When a fire seizes upon a photographic studio and its immediate environments it is usually of an energetic character. This is to be attributed to the quantity of wood employed in its construction, and to the numerous blinds and curtains present in every well-appointed studio, rather than to the inflammable nature of any portion of the stock therein contained; for, unless operations be conducted on a more than usually large scale, a gallon or so of collodion and the same quantity of ether, alcohol, and varnish may be considered to constitute the fire-aiding stock of the establishment. Neither professional nor amateur photographers now make pyroxyline on a large scale; hence that element of danger may be left out of sight. As a matter of fact, gun-cotton of a highly-explosive kind is not of much use to photographers; while the best description of soluble cotton is not at all explosive, or, at most, it is so only in an exceedingly mild degree. Of the really dangerous explosives sometimes made use of in connection with photography—such as the iodide or chloride of nitrogen, or the fulminates of silver, gold, or mercury—it is unnecessary here to speak; for in nearly every case experiments made with such substances are carried out under the control of persons who are generally so fully alive to the danger attendant upon the use of such agents as to have taken every possible precaution against accident. The probability of igneous visitations from this cause need not, therefore, be further alluded to in connection with this subject.

Prevention is, without doubt, much better than cure. To adopt such precautions as will prevent the material of which the studio is composed from taking fire is a more philosophic proceeding than to trust to skill in extinguishing the flames during the progress of a conflagration.

The sudden generation of gases which do not support combustion is an admirable mode of putting out a fire. Many readers will recollect an incident which occurred in connection with a large ship laden with inflammable materials. As soon as it was reported to the captain that a serious fire had broken out and was already raging in the hold he quietly retreated to his cabin and, by means of a ring, pulled a string in one of his cupboards, and then returned upon deck assuring the alarmed passengers and crew that in a few minutes all danger would terminate, as the fire was being assailed by a stronger power, which would prove resistless. And so it proved. A few minutes after one of the hatches had been cautiously opened the fire was extinguished. By the act of pulling the string a vessel containing sulphuric acid had been inverted and its contents poured into a barrel containing common chalk or whiting, the effect of which was an immediate and copious liberation of carbonic acid, in the presence of which flame cannot exist. Other gases act even more energetically than carbonic acid as fire extinguishers, and form, or have formed, the subject of patents for fire annihilators.

We have already said that "prevention is better than cure." If wood be steeped for a short time in a solution of tungstate of soda of the specific gravity of 1·2, such wood is both rendered non-inflammable and also impervious to rot or decay. Even wood that has succumbed to the ravages of the last-named destructive powers is stated, with authority, to be restored to its original condition of durability by being treated with the tungstate. This important salt is formed by the addition of tungstate of lime to hydrochloric acid and chloride of sodium, as much chloride of lime being produced as a by-product as will pay for the working expenses. A patent has been taken out by the Rev. Dr. Jones for the application of this substance to wood for the purpose of rendering it fireproof; and a short time ago a number of gentlemen were invited to witness some experiments which showed its great power as an effectual resistant to the ravages of the devouring element. Two small stacks of wood were made—one of ordinary, and the other of tungstated, wood. Both were saturated with paraffine and ignited. The former burnt fiercely, and every vestige was rapidly consumed to ashes; the latter burnt only so long as any paraffine remained. When the flame reached the wood it there ceased. Two wooden huts, constructed of Scotch fir, were treated in a similar manner. One was reduced to ashes, the other was merely charred on the surface. The trials were varied by placing packages of gunpowder in wooden kegs thus made fireproof, and placing the whole in a fire of petroleum and shavings, all tending to prove the great value of tungstate of soda as a most effectual means of preventing wood, paper, calico, and other inflammable materials from catching fire.

Seeing, therefore, that photographic studios thus run special risk, it will be wise of their proprietors or occupants to devote some spare hour to the impregnation of their exposed timber, blinds, and curtains with tungstate of soda, which, while its cost is slight, may, in this particular direction, prove invaluable.

SCHOOLS OF ART AND PHOTOGRAPHY.

It is curious to observe the unimportant part that photography has hitherto played in schools of art. There are two or three standpoints from which this important question may be viewed, and at some future day we shall probably return to it; but in the meantime we will say a few words upon photographs as suitable copies for the students to work from.

We think we are justified in saying they are never used for this purpose in any of the schools now in existence, the number of which is considerable. If we are wrong in making this statement we shall feel pleasure in being set right; but we are quite convinced that, if they are in use at all, it is not a general practice.

It is long since the old-fashioned copies became exploded. The orthodox cottage with man at the door, Noah's ark, sheep, and ducks on the pond, elegantly filled in with a very hard pencil, are things of the past; but we find that there is a fashion in everything, and drawing from the "flat," as it is termed, is taught from an equally orthodox class of copies, chiefly of the French type. These consist principally of heads, &c., taken from celebrated pictures and statues, many of which are really fine works of art, but a large number are frequently very inferior.

There are, probably, two main causes which have hitherto militated against the use of photographic works being used in schools of art for the particular branch of instruction which is called "drawing from the flat."

Firstly: "Drawing from the flat" is what may be called the "second stage" of instruction, in which the pupil, having mastered outline drawing, is put to gain a familiarity with shading effects produced by lines. We have no doubt that in the preliminary stages of this instruction the actual lines are necessarily put before the pupil to show him the mechanical method by which, if we may use the term, the shadows are laid on; but that too much of this mechanical copying is not desirable is evident, because in the more advanced stage the pupil is taught to invent his own shading effects by copying from the round, namely, by copying casts and statuettes. What instruction could equal the effects of light and shade which may be conveyed by the study of a well-arranged Rembrandt picture? Again: the sooner the pupil can dispense with the slavery of detail, so well exemplified in the Chinaman who copied with so much elaboration the rent in the coat, the more nearly he will approach the true artist. Further: how are we ever to reproduce the exquisite outline of Milo's *Venus Victrix*, in the Musée du Louvre, and similar works of art, before the student except through the aid of photography?

The second of the objections to photography's aid in the instruction of art-students is rapidly being overcome. We want an orthodox size—say 20 × 24 inches. Enlargements are now only a matter of detail.

ON THE INFLUENCE OF HEAT DURING THE PREPARATION OF DRY PLATES.

Following up the series of experiments (recorded in our issue of the 21st ult.) on the influence of cold on sensitised plates, we have during the past week made a careful examination of the effect of heat during their preparation, with a view to answer the question so frequently put, as to whether it is better to dry spontaneously or by artificial heat, and, if the latter, as to what is the most suitable temperature.

We are aware that this is a question on which both opinion and practice vary very much, some operators holding firmly to spontaneous drying, while others are equally strong in the belief that artificial heat greatly improves the results; and we even know some successful amateurs whose opinions have become modified from time to time, just as a successful batch of plates had happened to be finished in the one way or the other. The result in such cases, no doubt, depended on other causes, although in the absence of anything like systematic observation the effect of temperature seemed the natural explanation.

We may as well mention at the commencement that, in carrying out the experiments, our principal object was to ascertain whether as good results could be obtained by rapid drying as by the more tedious and often inconvenient spontaneous method. To those engaged commercially in the preparation of dry plates it is really of little importance by what mode they dry their plates, as they can easily make suitable arrangements for any method that may be considered best; but to the amateur, who has generally to work under considerable disadvantages, and who very often can only get the use of the room in which he works for a limited time, it is of importance that he should be able, if possible, to dry and finish his plates as rapidly as he can prepare them.

To ascertain whether this could be done without any sacrifice of quality, we have had constructed a simple but very efficient drying-box, the inside measurement of which is three feet long, twenty-one inches deep, and nine inches wide. At a distance of six inches from the bottom the box is divided into an upper and lower chamber by a plate of pretty thick iron. In the lower chamber is fixed a tube carrying five very small Bunsen burners, so arranged as to hardly warm the plate, which is three inches above them, when burning at their lowest, or to raise it to nearly a red heat, if that were desired, when fully turned on. The upper chamber, one side of which is a sliding door, is, of course, light-tight; blotting-paper is laid on the iron plate, and on this the plates are set up on edge. On the top there is a four-inch chimney to carry off the heated moist air, and which is bent twice at right angles to prevent the access of light. A thermometer let into a hole in the top completes the arrangement, which need only cost a few shillings, and answers the purpose admirably.

The processes selected for experiment were emulsion with a trace of free bromide, and beer and albumen, as typical of most of the modifications at present in general use, and three plates by each process were prepared and dried at each of various temperatures, ranging from that of the atmosphere to 110° C., the former taking nearly five hours to dry completely, while the latter was perfectly hard in two minutes. An examination under the microscope with a half-inch object glass showed that, mechanically at least, there was no apparent difference between plates dried at low and high temperatures, the emulsion plates in all cases showing merely as a stain on the glass, while those prepared in the bath exhibited an almost imperceptible tendency to crapy lines, caused, doubtless, by a slight excess of water in the solvents.

The true tests, however, of sensitive plates are their rapidity and the quality of the image produced by development, and those tests we proceeded to apply in the following way, which we have found satisfactory:—For the purpose of securing constancy and uniformity of illumination we used an argand burner, consuming eight cubic feet of gas per hour; and at a distance of fifteen inches from this we placed the plate in a printing-frame under a test negative prepared for the purpose, and which consisted of a band five inches long and two inches broad, very delicately graduated from perfectly clear glass at one end to complete opacity at the other, and divided by lines and numbers into twenty-five parts. Having by one or two experiments ascertained the proper exposure, we exposed the whole batch one after the other, and then developed them as quickly as possible—the emulsion plates with Colonel Stuart Wortley's strong developer, and the beer and albumen with acid pyrogallic acid and silver in the ordinary way. We cannot spare space to record the whole of the experiments, but the following statement of the general results will be sufficient.

Plates dried spontaneously at the temperature of the atmosphere are slightly more sensitive than when dried at a higher temperature. But in the case of the emulsion, at least, there is a slight tendency in the film to leave the glass during the washing after fixing, and both it and the beer and albumen are liable to marking if the temperature should rise or fall during drying; in other words, if one part be dried more rapidly than another there is a tendency to the formation of a line where the change has occurred, and as the difference in sensitiveness is not more than two in twenty-five it is not worth taking into account.

The plates dried at from 40° up to 90° showed no perceptible difference in sensitiveness or in quality of the developed image; but the beer and albumen plates lost some of their usual brilliant surface when dried at 100°. At 110° both kinds of plates gave evidence of deterioration, the surface becoming slightly granular, the sensitiveness decreasing considerably, and the resulting image being hard and irregular.

The conclusion at which we therefore arrive is this:—Plates may safely be dried at a temperature of about 90° C., and we think they should be transferred to the drying chamber as soon as the loose moisture has ceased to run off. In this way each plate, after removal from the preservative solution, will be ready for the drying-box as soon as its successor is ready to take its place in the draining-dish.

We may add that we find the most convenient draining-dishes to be the four-ounce covered pots used by chemists and perfumers, consisting of very much earthenware and having very little containing space. They stand firm, and if roughened on the bottom by a rub on a piece of sandstone are not liable to slip, even with a very large plate, when one corner is placed in the pot and the other caused to lean against a wall or other suitable support.

OLEATE OF SILVER.

Oleate of silver has been mentioned in connection with the photographic art, and a little of the "natural history" of this exceptionally-rare substance will, perhaps, be acceptable to our readers. As regards its capabilities to act a part in our work we plead perfect ignorance; but we can see that it may be capable of useful applications at present undeveloped. We can, however, give our readers a little more information upon its chemistry than is to be found in the books from which the working chemist, photographer, or general experimentalist usually takes his inspiration.

"Oleic acid" is the term somewhat indefinitely applied to the fluid portion of the fatty acids obtained upon saponifying an oil. Soaps being the compounds obtained upon decomposing an oil with one of the alkalies—glycerine being set free and the oleate of the alkali formed—oleate of silver may, therefore, be viewed as the silver soap. In the manufacture of stearine candles oleic acid is now largely obtained, but in a more or less impure state. Palm or any other saponifiable oil is distilled with superheated steam, when the products are found to consist of two layers, one of which is glycerine and the other the fatty acids. The latter, submitted to the hydraulic press, separates into the solid stearic and palmitic acids, whilst the oleic acid is got as a light yellow fluid.

Oleic acid crystallises from an alcoholic solution in dazzling white prisms, which melt to an oil at a temperature of 14° C. Solid oleic acid oxidises slowly when in the solid state, and more rapidly when liquid; therefore it is considerably modified in its character by age, and we find that the change in composition alters considerably the character of the resulting salts. Thus the baryta salts of oleic acid differ considerably according to the acid from which they have been procured; and the baryta salt of the oxidised acid is much more soluble than that procured from a recent specimen.

Oleic acid is generally stated to be a bibasic or bivalent acid; it is said that it forms neutral and acid salts. A neutral salt will therefore be $C_{36}\ H_{66}\ M_2'\ O_4$, and the acid salt $C_{36}\ H_{67}\ M'\ O_4$, "M" being a univalent metal.

Oleate of silver is procured by double decomposition, the neutral alkaline salts being soluble, particularly the ammonia and potash salts. The sodium salt, being rather insoluble, is not so suitable for making the salts by double decomposition. In Watt's *Dictionary of Chemistry* it is stated that oleate of silver is "procured by double decomposition, but reduces as soon as formed." This is all the information contained in that work on the subject. It does not, however, agree with our experience. Oleate of silver is easily made by decomposing oleate of potassium with nitrate of silver in comparatively weak solutions, according to the following equation:—

$$\underbrace{K_2\ C_{36}\ H_{67}\ O_4}_{\text{Oleate of potassium.}} + \underbrace{2\ Ag\ NO_3}_{\text{Nit. of silver.}} = \underbrace{Ag\ C_{36}\ H_{67}\ O_4}_{\text{Oleate of silver.}} + \underbrace{2\ K\ NO_3}_{\text{Nit. of potassium.}}$$

If the oleate of potassium be fairly pure, and an excess of alkali be avoided, our experience does not confirm the statement as regards its instability. In fact, this salt obeys the general laws of the silver salt, and is sensitive to light in the same manner that most organic silver salts are. It was probable that the original oleic acid used was contaminated with formic acid. Pure oleate of potassium is easily made if a fair specimen of the acid be at hand. The oleic acid is digested on a water bath, with a slight excess of a solution of carbonate of potassium, until all effervescence of carbonic acid has ceased. When this is consummated it is poured into a sufficient quantity of alcohol to precipitate the excess of carbonate of potassium. An alcoholic solution of oleate of potassium remains, which should be evaporated to perfect dryness upon a water bath.

The following proportions may be used:—Half-an-ounce of carbonate of potassium (salts of tartar) is digested with half a fluid ounce of oleic acid and an ounce of distilled water as long as carbonic anhydride is evolved, and the whole is poured into four fluid ounces of rectified spirit. On standing it separates into two layers. The upper one consists of a strong alcoholic solution of oleate of potassium, and the lower one an aqueous solution of the excess of the carbonate of potassium. The upper layer, after filtration and evaporation, yields a very pure oleate of potassium. When this oleate of potassium is dissolved in distilled water, and decomposed in the cold with a solution of nitrate of silver (which may be very faintly acidulated to advantage), a white precipitate of the oleate of silver will be procured, which is perfectly insoluble, and may be washed in the dark without any sensible decomposition.

We direct special attention to a short article in another page descriptive of M. Girard's method of photographing crystallisations, and we do so for the purpose of making a brief comment upon it. To this branch of photography we have lately given much attention, and purpose in a future number to enter upon the subject with all the requisite degree of detail. In the meantime we may observe that to attempt the photographing of crystals by means of ordinary light will only prove a waste of time. Let anyone spread upon a microscopic slide a weak aqueous solution of such a crystal as bromide of cadmium, and, after applying heat sufficient to start the crystallisation, let him examine it in the microscope. The arborescence seen is of such a feeble character as to be very imperfectly visible, while the *details* of the crystallisation will not be visible at all. But let him now illuminate the subject by means of a beam of *polarised* light, using at the same time a Nicol's prism as an analyser, and what a change is instantly produced! The feeble, dim-looking crystallisation is converted into a mass of rich foliage, having variegated colours of the most gorgeous description, with sharp, bold outlines. What we have said of one photographic crystal applies to the great majority of such substances; and if it be desired to photograph them in a manner at all effective it is absolutely imperative that the light by which they are to be illuminated should be polarised. We shall say nothing at present concerning the influence of a selenite stage upon the actinic nature of the polarised light, as we shall treat of this subject on an early occasion. We merely observe that the influence exerted is of a very marked character.

PRINTING DIFFICULTIES.

No sooner does the hot weather set in than up crop a variety of difficulties unheard of during the cooler months, and rife are the complaints of bad paper, baths going wrong, and similar troubles. Now, if a sample of paper worked well at one time it is only reasonable to suppose it would work well at another—say any time within six months of the first trial—presuming it to have been carefully kept in the interim. It is a very different matter knowing that certain effects will probably take place under certain conditions to knowing *why* such effects take place. There is an element of uncertainty in the matter, the removal of which is absolutely necessary to ensure perfect results.

With regard to silver printing. Without any previous indications a sample of paper that has been working as satisfactorily as could be wished for some time commences to give streaky and unpresentable proofs, and no mode of doctoring or toning seems to set it right. The paper is blamed, and fresh samples are tried, but often with no improved results. New baths are made; still streakiness and spottiness form the order of the day. Then just as suddenly all goes well again, seemingly without any reason, and we are at our wits' end to know where the fault lay.

There are two distinct classes of "mealiness"—under which designation I will place streakiness and spottiness. One class is the result of the toning bath being out of order or unsuitable for the paper to be toned. This occurs at any time and in any weather, and may be distinguished from class No. 2 by the markings being all more or less toned and altered in colour from that of the proof as it came from the printing-frame, the lights and shadows being stippled, as it were, one into the other in a very unsightly manner. Few printers are unacquainted with this disease. The other order of mealiness is that portions of the proof refuse to tone, spots and streaks (generally taking the direction in which the albumen was drained off in albumenising the paper) appearing, which on careful examination are found of a character entirely different to those produced in the previous case. Until the proof has been submitted to the action of the toning bath the faults are, however, scarcely perceptible. Incipient markings, consisting of more or less depth of colour can, on careful examination, be detected on the surface of the prints, pointing out that the fault, whatever it may be, is not connected with the toning bath. We examine the paper and find nothing apparently wrong; the sensitising bath is the same as when we obtained good work.

Possibly, to make sure, we mix a new one with a reliable sample of silver nitrate; still the faults remain, and day after day during the summer good and bad batches of prints are turned out, alternating in the most provoking manner. It occurs in this wise:—

The extremely delicate layer of chloride of silver formed when the paper is floated on the silver bath is more or less soluble in a strong solution of the silver nitrate, should the temperature rise to 70° or thereabouts, the solubility varying, however, with different samples of papers and the dryness or horniness of the albumen film. This silver salt is removed by solution from the exterior albumen surface—the albumen remaining insoluble, and forming a protective covering to the underlying stratum of chloride, which, although pervious to light, is impervious to the toning solutions—the consequence is that these protected portions refuse to colour, and streaky, spotty proofs are the result. The remedy is obvious:—In hot weather reduce the strength of the silver bath to about thirty or forty grains, and the chloride will remain undissolved and the cure be effected.

It is important that printers should particularly notice the difference in the appearance of this disease from that produced by improper toning. In one case the spots are toned, and in the other not at all unless they have been subjected to the toning for a very protracted period; even then very little alteration in colour is perceptible. I am inclined to think that in summer the addition of nitrate of soda to the silver solution would be generally useful, as I have never found this peculiar streakiness occur when using it. It may either be that the nitrate of soda interferes with the solution of the chlorides, or, more probably, that the use of a weaker solution of silver nitrate was the cause, although the mixed salts were used with quite a different intention—that is, for the sake of economy. During the winter season or cool weather the plain nitrate of silver bath, in my hands, produces better results than a combination of salts, although equally good proofs can be prepared on either bath in warm weather. EDWARD DUNMORE.

ON PHOTOGRAPHING CRYSTALLISATIONS AS SEEN IN THE MICROSCOPE.

M. J. GIRARD has recently been working on this branch of scientific photography, and, in a note to the French Academy of Sciences, has recounted his experience, which may interest our readers. He operated first on sal ammoniac with an enlargement of twelve diameters, and afterwards on the arborescences of bichromate of potash. It is of advantage to operate by transmitted light, because it is possible thus to obtain a greater intensity of light.

M. Girard made use of an apparatus composed of a metallic slide fixed to a tablet that carried the camera. This slide consisted of different pieces fitting telescopically, so as to be capable of being drawn out with the expansion of the camera. Then there were a lens of about one-third of an inch diameter, and made so as to be able to yield an enlargement of from eight to twelve diameters; a spring clip which supported the objects; the bits of glass upon which the crystals to be photographed were formed, and a strip of glass of a cobalt-blue tint, the object of which is to give a monochromatic light favourable to obtaining a photographic image; together with a plane mirror, movable and capable of reflecting the light parallel to the optical axis.

Exposure varied a good deal, according to the transparency of the crystals, from instantaniety to a duration of two or three minutes. When greater relief is wanted, so as to put the angles of the crystals in more prominence, an oblique light is used, easily got by turning the reflector a little. However without apparent effect in photography the brilliant effects of polarisation may be, they allow crystals often to be projected on a black background, thereby adding much to the clearness and delicacy with which their details are rendered. The polarising apparatus consists of two pieces—the polariser and the analyser. The first of these objects is placed before the lens, and the second between the lens and the sensitive plate.

Crystals are prepared for photographing purposes by spreading on a plate some of the saline solution, and allowing it to dry in a perfectly level position, so as to secure evenness of effect. It is well to prepare solutions of different degrees of concentration in order to be able to choose for reproduction those samples which offer the best defined characteristics.

ON A METHOD OF COMBINATION PRINTING APPLICABLE TO GROUPS.

EXCEPT, perhaps, old maids desiring to be made to look young and beautiful, there is no class of subject which tries photographers' patience so much, or which yields so unsatisfactory results, as family groups. When there are children a really fine picture is sometimes an impossibility, and even when there are none it is a chance if somebody do not move and spoil your best plate. Not unfrequently a photographer will try again and again after a failure from such a cause, only to find that things grow worse with every plate. The nervous, unsteady sitter grows more and more nervous and unsteady at every trial, and the example becomes infectious, so that it often happens that after long trial of this kind the photographer has to turn back upon his first attempt as the best of all; and the worst of it is that a man seldom gets any thanks for all this extra labour. He is expected to turn out a work of art as well as a number of sharp portraits; and, as his efforts are too often of necessity concentrated upon the latter object, it is not to be wondered at if people think his labours unsatisfactory.

Could some plan be hit upon whereby the artist would be relieved of his anxieties on the latter score, and enabled to devote his thoughts more freely to artistic grouping, knowing that if a head or two failed here and there it could be easily replaced, the benefit as well as relief would be very great. As it is, these imperfect groups are often retouched and mended after printing with a view to remedy defects—a process that is of no advantage, so far as regards likeness, nor a source of any profit to the photographer. It is better at once to take the figures separately and piece them afterwards into a group, which may be re-photographed; or, when a head is bad in a group, to take it separately, cut it out, and paste it on to the print of the group afterwards. When rolled and touched neatly round the edge when cut this plan does very well, the joinings being hardly, if at all, noticeable.

Another plan is to cover the separate good negative of the restless sitter with black all but the head, and to stop out the head in the group, so obtaining a correct likeness by double printing. This operation is, however, very difficult to manage satisfactorily, requiring great exactness of fitting and neatness of hand, not easily come by, while after all it may prove to be useless. The time taken is, besides, sometimes very long—a dense negative, for instance, may perhaps take two days before a complete picture can be obtained.

A German photographer, Herr Riewel, struck with these difficulties, has recently made an effort to overcome them in an ingenious fashion. He was one day busy with that delectable occupation—photographing a group of a mother with her three children. The first effort resulted in good portraits of all except the eldest child, who had moved. A second attempt was made, when the youngest turned out unsteady, and the persistent squalling of that member of the family effectually prevented any further trials. The picture was required by the lady as a birthday surprise for "her man," and she was disappointed. The photographer was chagrined at the ill results of his labour, and from one motive or other he felt anxious to make a better job of it. As he was looking at the plates before destroying them it crossed his mind that it would be a good thing if he could transfer the head of the eldest boy from the one plate to the other; he should then have a perfect picture. And he resolved to try and effect this by some other way than those we have described, none of which had any attraction for him. Fortune favoured him; he succeeded in making the transfer, and in delivering a perfect picture without any delay or hindrance. The method by which it was done is a simple one, and may be shortly described.

In order to protect the negative to be operated on, whether it be varnished or not, it is better to cover it with a filtered solution of gum to the strength of about one to ten. After this is dry the outline of the portion to be taken out should be carefully traced by means of a fine etching-needle; and when this is accomplished the head or space within that is removed by scraping with a knife. The spot of glass is then cleaned and coated with the solution of gum. The round head on the other plate is then treated in a similar manner so far as the tracing-out is concerned. This done, a wedge-shaped slit is cut out between that tracing and the foot of the plate. On the isolated portion a stream of water is then gently directed, so that the film may, if possible, be loosened from the glass; but care must be taken that the head is not washed away by it. So soon as the film begins to show signs of rising a piece of wet filtering-paper is placed upon it, and drawn slowly and carefully over the slit until it is brought to the edge of the plate. When it has reached that point the glass may be turned over, and paper and film will easily come away together.

The further operations are comparatively easy. The portion cut out and thus carried away has to be placed carefully on the cleared space in the good plate, and fitted to it without any air-bubbles. The gum causes it to adhere, and it is then not difficult to withdraw the filtering paper support. That removed, the new bit of film is smoothed and pressed firmly down beneath a bit of glossy writing-paper damped slightly with saliva. Any fold or unevenness may be removed by a wet brush, and finally the negative is varnished all together, and touched up at the joinings as required.

Newly-taken negatives, or those developed by pyrogallic acid, have a tendency to go swimming off the glass, so that this plan should only be tried with negatives that have been developed with iron. If not, they should be laid in acidified water, and great care taken in guiding the onflow of water. When larger portions of collodion films have to be removed the better plan is to cover the place with albumen, which has sometimes enabled the film to be removed without any extra support whatever.

There are, doubtless, some difficulties in the system, and it is only very careful workers indeed that need hope to succeed, while even they may have difficulty at times in cutting out the exact portions required so that the new head shall fit the old hole; but the plan offers nothing impossible. The amount of after-labour and vexation which it would save when the transfer has been successfully accomplished is well worth a little effort.

ON MOULDS FOR RELIEF PRINTING.

In following the course marked out in my last communication I propose to give to your readers the results of experiments having for their object the production of intaglios for relief printing without hydraulic pressure.

I would not for a moment wish anyone to suppose they are thought to be exhaustive; indeed I can see a very wide field for experiment here, and of such extent as to be beyond the power of one to tread all the paths indicated, and attend, at the same time, to such duties as every day brings forth. Casting with plastic materials will be the method to which I will draw attention.

The advantages appertaining to sulphur are so many that I was tempted to try to produce with this body moulds having qualities suitable for work. If only on the score of its low cost the trial was worth making. It will be well to call attention to some of the qualities of this element in order to understand what are the difficulties to be expected in its use. Sulphur is *brittle*, is a *poor conductor of heat*, melts at 232° Fah., and is quite liquid; with an increase of temperature it becomes thick and viscid; and upon a further increase it again assumes the fluidity of water, and ultimately sublimes.

A metal intaglio was selected for trial. The subject was one calculated to give a fair test, being an impression from a leaf with delicately-marked veins. A quantity of sulphur was melted until just liquid, and then poured over the plate, the result being a sharp cast, but with unpleasant lines in several places, evidently caused by waves of the liquid meeting, indicating that a higher temperature was required. A second quantity of sulphur was heated until it assumed the thick state, the result of which, when poured on the mould, was an equally sharp cast, with less of the defect mentioned as existing in the former one. Through the rapid cooling the sulphur was in the elastic condition which is the result of such treatment. Of course it ultimately lost this property and went hard. Another cast was made with the sulphur heated until near the point of sublimation, the result being a cast free from defect so far as regards manipulation. The mould was then heated until sulphur placed on it just melted. With this method the whole surface of the casting was pitted with small bubbles, as if the sulphur had been suddenly cooled after entering into a state of ebullition.

The real fault of all these productions was *brittleness*. The said modifications of sulphur produced by the addition of fat were tried, but still this objectionable quality could not be removed; and in every case a great tendency to crack was noticed when subjected to rapid changes of temperature. Bearing in mind that the same is to be said of glass, and which property is to a great extent removed by using it as thin as possible, an effort was made to obtain very thin sulphur casts, the process being as follows:—The mould was heated so as to allow the hand to touch it without any unpleasant sensation, a piece of glass being treated in the same way. Melted sulphur was then poured over the mould, the plate of glass placed over the whole, and pressure applied with the hand so as to force out all the sulphur except that remaining in the interstices of the mould. By these means thin casts were obtained which stood a fair amount of rough usage as regards temperature. A great difficulty was experienced in separating these thin casts from the mould. With the great advantages sulphur possesses in point of easy manipulation it does seem a pity that its brittle nature has not been overcome.

However, I do not think I shall be raising false hopes in saying a substitute is found having a minimum of the disadvantages sulphur possesses. W. E. Batho.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Coming down the Pentonville-road a few evenings ago my attention was attracted to the specimen-case of a photographer, in which was a picture I had previously seen under very different circumstances. It was the beautiful little group of children, by Mr. Ramsden, published in your last Almanac, from which volume it had, without doubt, been abstracted. While examining it, and explaining to a friend that it was a mechanical print, the doorsman or touter accosted me, and pointing to the picture said:—"An evening light, sir! This kind of picture we always take in evenings such as this. You should step in and be took. Guaranteed first-class likeness by our instantaneous process." In reply to the query as to whether his principal had taken the identical specimen in question, I was assured that he had done so, and that its exceptional excellence was due to its having been done in the evening, which, he said, was the best time for photography; "hence," said he, "if you want to be took in that there style *now's* your time!"

I had really given Scotch clergymen credit for being too hard-headed to have recourse to such a puerile performance as that approvingly described by Dr. Nicol in a recent batch of his *Notes from the North*. The popular minister of a large Edinburgh congregation, with the assistance of the beadle, exhibited, in the course of his sermon, or, more probably, at its commencement, a large photograph of Holman Hunt's picture, entitled *Behold I Stand at the Door and Knock*. Why, unless bent upon making himself ridiculous and outraging the common sense of his congregation, this minister should have made such a singularly unhappy selection from what is designated "sacred" pictorial art as a picture which has provoked more deserved hostile comments than any other, is quite inexplicable. Photography *is* capable of making more intelligible many pulpit prelections, but not in the childish way here indicated. If the preacher find himself lacking in the descriptive power he considers indispensable in order to penetrate the heads of his hearers when trying to convey to them an idea of oriental scenes, manners and customs, geography, or archæology, then by all means let him enlist the powerful aid of photography, darken the church, and, by the agency of the magic lantern, throw upon an eighteen-feet screen reliable views taken by the camera. In this way photography may prove a powerful assistance to pulpit ministrations; for, after all, impressions which reach the brain through the eye are more lasting, generally speaking, than those which arrive at the same goal through the agency of the ear. It has already been placed on record that a London clergyman has claimed photography as a handmaid to religion, because it can bring religion home to the poorest cottager by making him acquainted, through the reproductions of Raphael's cartoons and similar works, with "the sublime truths of our faith." May the day be far distant when religion will require such "scenic effects" to further its reception or appreciation!

Is it not too bad that Mr. Sutton should be poking fun at this country by saying that Welsh scenery is rather beautiful than grand, that Welsh mountains are lumping mounds which an active fellow may run up on one side and down on the other to give himself an appetite for breakfast? Because Mr. Sutton can walk up and down Snowdon before dinner, while the peaks of the Matterhorn are as inaccessible to ordinary mortals as the mountains of the moon, proves nothing. Mere inaccessibility is an imperfect test for grandeur; were it otherwise, the chimney of St. Rollox would, then, be a "grand" object, for its apex is certainly inaccessible to "ordinary mortals." The powers of locomotion of one man must not be the gauge of those of another. A well-known London photographer is *said* (see the spiritualistic papers of the period) to have once been whisked away from the house of the Guppys and transferred to another—more than a mile distant—in a second or two of time, by spirit agency of course; but although *he* could in this way pay a flying and "fly-by-night" sort of visit to such sparrows as might happen to be at that late hour on the chimney tops, it is out of the question that we should reason from his transmigratory powers as to the extent of those of more ordinary mortals. The Welsh mountains are both beautiful and grand, they afford subjects of unspeakable interest to the artistic tourist, and, as for the facility with which they may be ascended and descended, I have heard of two reckless tourists losing their lives through falling down some of their precipitous cliffs; but these people evidently possessed not the physical agility of friend Sutton, nor could they command the spiritualistic aid accorded to the city photographer who is said to have taken the supramundane flight to which I have alluded.

With respect to the best mode of obtaining sufficient heat for the reduction of residues, I am glad to be relieved from the task of writing at such length as I should otherwise have done, by being informed by the Editors that they have requested a gentleman, in every way competent, to undertake a commission to write a practical and complete treatise on the subject, intended to occupy, perhaps, two or three articles, and which are promised to appear during the present month.

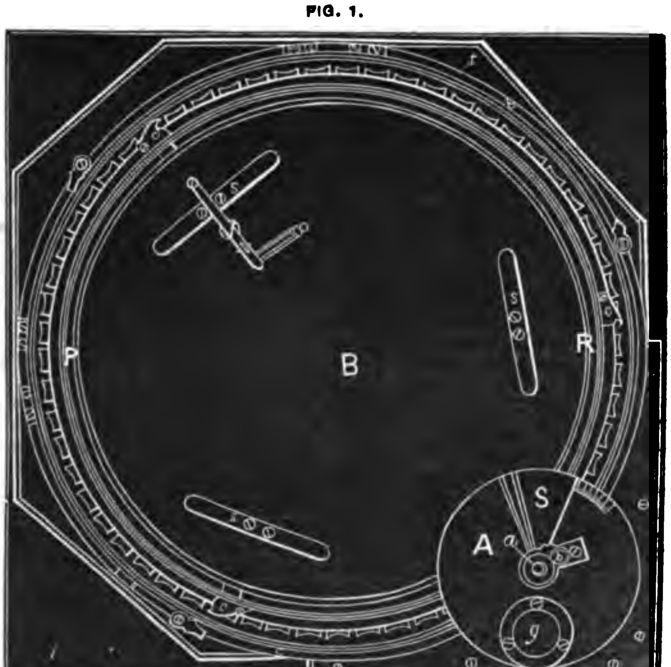
Observing that you give an inquiring correspondent a receipt for dyeing cloth a non-actinic colour by immersing it in bichromate of potash, permit me to describe what I believe to be a better way than the method you have given, which is certainly good enough for the purpose required, viz., the mere dyeing of a yellow colour. The dyeing of a piece of calico or textile fabric of any light description does not render it suitable for photographic purposes, because there is always a leakage of light through its interstices, so that if the fabric were even black a portion of white light would be admitted. To prevent this the best way of proceeding is to make a solution of gelatine to which a *little* sugar is added to prevent its becoming too hard and brittle when dry, and with this gelatine to mix the yellow or orange dye intended to be used. Judson's orange dye will be found better than bichromate for the purpose. The cloth to be dyed is immersed in this solution of orange gelatine, previously made so warm as to impart to it a sufficient degree of fluidity. In this way the interstices of the cloth may be filled up, and the filtration of white light through them rendered quite impossible. If it be desirable that the gelatine should be rendered insoluble, the cloth, when nearly dry, must be immersed for a short time in a cold aqueous solution of chrome alum.

I am delighted at having in my last *Notes* made such remarks as to have elicited from Mr. Werge the excellent and very practical method he has described of producing artistic backgrounds in portraits. I, too, have seen several specimens produced in the manner described by him, and tender my testimony as to the efficiency of the process.

AN APPARATUS FOR OBSERVING THE TRANSIT OF VENUS.

We recently called attention to a mode of getting instantaneous impressions of the sun's disc introduced by M. Janssen, and intended to take a succession of images upon the same plate. Since the publication of this method Mr. Warren De la Rue has published in the French journal, *Les Mondes*, an account of a simpler, though similar, apparatus, and with more detail. The mechanical contrivances of this instrument may be of wider application than merely to solar

FIG. 1.



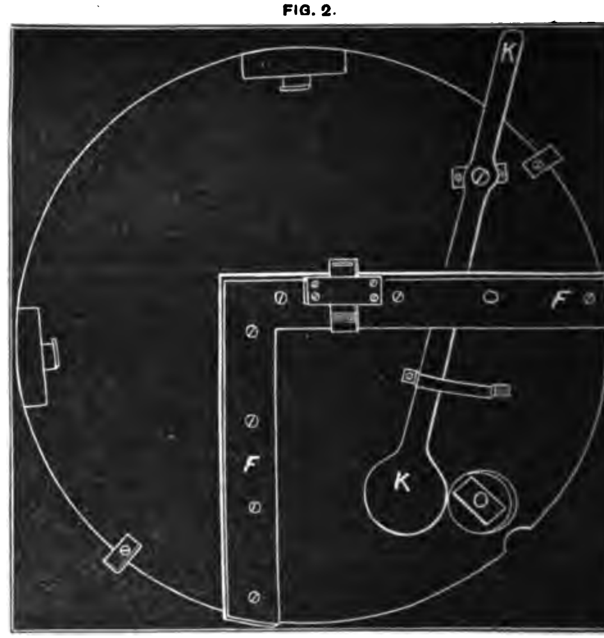
photography; but, in any case, the subject is at the present time so far specially interesting that we propose to put the substance of Mr. De la Rue's paper before our readers.

In his apparatus the sensitive plate is contained in a case that turns on an axis eccentric to that of the telescope. In the shutter of the fixed frame which contains this revolving slide a radial slit is made, and so placed as to be near the centre of the telescope tube at the observer's end, and presenting a part of the zone about a sixtieth of its circumference. Just above the shutter there is placed a movable circular flap with an adjustable slit, and the axis of which is just beyond the periphery of the plate-holder—consequently inside that holder. This carries a pin which falls into one of the sixty notches round the rim of the plate-holding frame every time it is moved, and exposes first a sixtieth part of the surface of the sensitive film, then shuts it up again, and then brings forward a new portion of it for exposure. Each time that the flap exposes instantaneously a portion of the plate contact is accomplished with the use of a certain pile, and a current is established with the electro-magnet of a chronograph.

The sensitive plate used should be a disc of rather less than eleven inches in diameter. The fixed holder is about twelve inches at its greatest diameter, and two and a-quarter inches thick. The whole apparatus weighs about twelve and a-quarter pounds, including the glass disc.

Fig. 1 shows the face of the apparatus, which is turned away from the secondary enlarging glass when it is placed in the photoheliograph, the cover (*fig.* 2) having been removed so as to allow

FIG. 2.

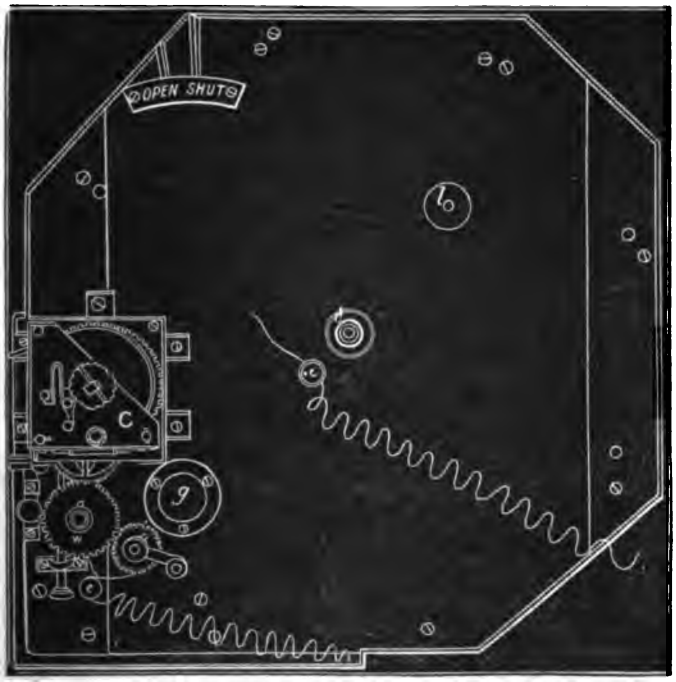


the different parts to be seen. B is the back plate of the case which holds the sensitive disc. It is surrounded with sixty notches, *t*, and sixty circular spaces, as seen in *fig*. 4, of the actual size. *c c c* is a ring screwed to B for closing the case, which is silvered on the inside in order to prevent the nitrate of silver from attacking it should wet plates be employed. A movable ring, which is similarly silvered, serves to hold the disc of glass perpendicularly to the axis of the telescope. It is removed by turning the clip at *c c c* in order to allow the disc to go into its place with the sensitive side next you, resting on three springs, *s s s*, and when put down again, as shown at R, is held in its position against the glass by the same clips. The plate so placed and held, the cover (*fig.* 2) may next be put on, and held there by the pins and clip, as seen in *fig*. 1. The slit O should, of course, be covered by the lever K, and the apparatus is then ready for use.

A in *Fig*. 1 represents the instantaneous arrangement. It is a circular disc of four inches in diameter, having at its periphery a radial opening of about an inch, which opening is provided with a shutter that completely closes it, or which may be adjusted so as to leave the slit open to any required size by simply turning the pinion *p*, which plays into the teeth of the cover for that purpose. The adjustment is facilitated by a graduated scale placed on the edge of the small disc as in the figure. On the opposite side a disc of red glass is fastened, of an inch diameter. In a certain position of the frame this glass allows the sun's image to be observed, and the apparatus can then be adjusted accordingly.

Fig. 3 represents the opposite side of the apparatus. At *b* is the axis of the plate-carrier, and at *a* the axis of the exposing disc, which has on it a toothed wheel connecting it with the clockwork of the telescope, as well as a winch, which allows it, when necessary for focussing, &c., to be turned by the hand. *w* is an intermediate wheel always in connection with *a*, and serving to connect the latter

FIG. 3.

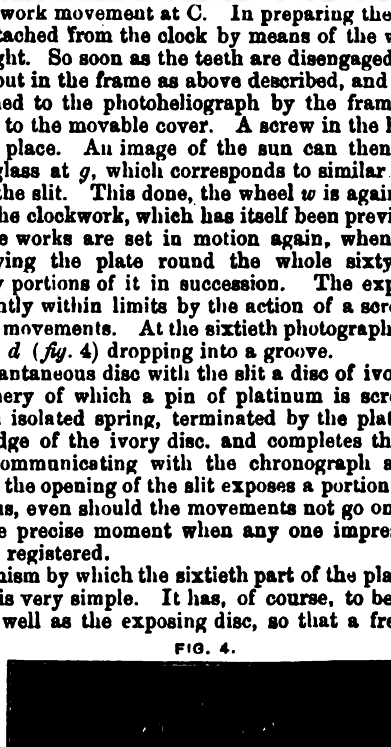


with the clockwork movement at C. In preparing the apparatus for action *w* is detached from the clock by means of the winch, turning from left to right. So soon as the teeth are disengaged the sensitised plate may be put in the frame as above described, and the apparatus is then attached to the photoheliograph by the frame FF (*fig.* 2), which is fixed to the movable cover. A screw in the heliostat keeps it firmly in its place. An image of the sun can then be examined through the glass at *g*, which corresponds to similar glasses on the other side of the slit. This done, the wheel *w* is again brought into contact with the clockwork, which has itself been previously stopped. This done, the works are set in motion again, when the disc will revolve, carrying the plate round the whole sixty notches and exposing sixty portions of it in succession. The exposure may be regulated slightly within limits by the action of a screw quickening or slowing the movements. At the sixtieth photograph the apparatus stops by a pin *d* (*fig.* 4) dropping into a groove.

On the instantaneous disc with the slit a disc of ivory is fastened, on the periphery of which a pin of platinum is screwed into the pinion *a*. An isolated spring, terminated by the platinum, presses against the edge of the ivory disc. and completes the current of a voltaic pile communicating with the chronograph at the precise moment when the opening of the slit exposes a portion of the plate to the sun. Thus, even should the movements not go on with absolute regularity, the precise moment when any one impression is taken can always be registered.

The mechanism by which the sixtieth part of the plate is thus each time exposed is very simple. It has, of course, to be moved round each time, as well as the exposing disc, so that a fresh portion be

FIG. 4.



placed under the slit, only that the latter makes a complete revolution while the former has only to go one-sixtieth part of its circumference. In *fig.* 4, which is of the actual size, D is a disc carrying a boss *n*, which is fixed on the axis of the shutter with the slit for instantaneous exposing. On D is fixed a peg *d*, which, at every turn of the axis *a* of the exposing disc, enters into one of the teeth or notches, *t t*, of the plate-holder, and causes it to revolve one-sixtieth part. It thus travels the distance marked by the dotted lines—an arc of 110 degrees. After quitting the teeth the boss *n* passes into one of the hollowings corresponding to its own curvature in the edge, thus keeping the plate-carrier firm, while, in order to allow the latter to turn easily, a part of this smaller disc or boss is cut away, as is shown by the figure.

Such is the ingenious contrivance of Mr. De la Rue. That it will prove useful in astronomical photography is extremely probable; but it is not likely to be available now for much service in the forthcoming transit.

PHOTOGRAPHIC TOURISTS.—KILLARNEY.

To those who at this season are off to the lakes, &c., in search of health and photographic pictures together, the experience of an old explorer may not be without its use. I have "done" the lakes of Westmorland and Cumberland, the mountain scenery of North Wales from Bettws-y-Coed to Dolgelly and Barmouth, and the Scottish lakes of Loch Katrine and Loch Lomond, but my last trip has been to *the* Irish Lakes of Killarney; and, as they, together with so many other things in Paddy's land, have furnished me with more "cautions" than any others, I will make them the text for my practical remarks.

Arrived at the Lake Hotel about six o'clock, my first step was into the grounds overlooking the lower lake, than which few views are more charmingly picturesque, and I inwardly resolved that that should be my first picture. My next step was dinner, of which I took a positive and not a negative view. It was still broad sunshine and I then put at once into practice my first rule for tourists:—Before ever you unpack your apparatus make a tour of inspection as to your future work. More time is lost in wandering about, camera on back, not knowing where to find your pictures, than is generally imagined. A thorough acquaintance with the scenery to be taken, which can always be obtained by a rapid survey of its general nature and position, will save a great deal of chagrin and useless fatigue.

It was well for me that I did so on the first evening of my arrival at Killarney; for, when once I had turned my back on the pretty lake, and had issued forth in search of other fields, I found myself in a dusty road, with a wall on either hand, along which for no less than three miles did I wend my weary way, in search of the borders of the lake, mountain passes, or picturesque scenery, but in vain. Private grounds skirt all the borders of the lake. One unbroken wall encloses the whole Muckross estate from the Lake Hotel to the Old Weir Bridge; whilst on the left hand the foot of Torc Mountain, covered with fern and bracken, presents a barrier of another kind. Strangers are warned off if they set foot within its mossy precincts. Imagine this in a broiling sunshine under a heavy camera, &c.! Three miles of chalky, dusty, glaring road, and not a view!

I at once made up my mind, as I returned hot and tired to the Lake Hotel, that, as a resort for pedestrian photographers, Killarney is the worst of lakes, and the Lake Hotel by no means the best to stay at. Access to the Muckross estate may indeed be obtained on payment of one shilling every time you enter, but even then you are confined to the regular road and walks. Pretty bits of the lake are visible from time to time. One remark applies to all such scenery—it is much more beautiful to the eye than in the camera, where the distant mountains sink into comparative insignificance, even when accompanied by a rocky, broken foreground with a large expanse of water between.*

Here another remark should prove a warning to the photographic tourist—he must well know the nature of his scenery in order to suit his day's work to his day. Sultry weather, such as I enjoyed all the time I was at Killarney, is the very worst for distant mountain scenery. One perpetual haze covered all the mountains, making it exceedingly difficult to prevent even the outline merging into the sky, and, of course, excluding any detail on their sides. In such weather near objects alone are eligible. The Torc waterfall was so short of water, and the light was so strong through the gap at the top, that my two views were not very beautiful. So I resolved to give a day to Muckross Abbey—a very interesting ruin, rather difficult to take in consequence of the contracted enclosure within which it is shut, and the crowds of merciless tourists who keep arriving in all sorts of vehicles, and walk in front of the camera or its field of view perpetually. The same remarks apply, even more strongly, to Ross Castle—another fine ruin on the island of that name.

As regards the lake scenery I was indebted to the kindness of the good chaplain at Muckross, and of Mr. Herbert, Jun., for the best

* The shores of Muckross Lake are much more picturesque than those of the Lower Lake; but the walks round them are strictly private, and special permission to photograph must be obtained.

opportunity of seeing and taking it. It is one of the great drawbacks to Killarney that *all* the boats for hire belong to the hotels, and in general they are let to parties which visit the regular tourists' objects. You may "do" the lakes, upper and lower; but you must go just where they take you, and may not detain the boats. To be able to have a boat to yourself, and get out here or there for a view, is a luxury which even the high prices paid for the journey will not procure. But my kind friends placed their boat and themselves at my disposal for the day, and forth we went, prepared to pass the entire daylight between the lower and upper lakes.

Well, here is my next caution to tourists:—Always make a note as to the hour at which your several objects ought to be taken. You naturally want the sunshine on your picture, and not into your camera, as I saw happening to several unhappy photographers who were shading their lenses with their hats in the blazing sun! Can you not imagine the result? Talk of halation! With the shady side of Ross Castle towards them, and the sun shining over and around it, there would be enough of it. But it so happens with poor Killarney that all the beautiful scenery lies to the south. The consequence is that you must either be turning back continually, or go right away to the further end of the upper lake and work down, all the morning and best of the day being spent before you begin. To do it to any effect you ought to start very early in the day, row through the channel between the lower and upper lakes not later than eight o'clock, take the Old Weir Bridge with the sun on the near side (it makes both a good picture and a stereo.); then take a view of the "Eagle's Nest," which will be still in sunshine, and row for the "Tunnel," picking up a pretty "bit" of island and mountain here and there. By all means land there and take both the "Tunnel" and the lake scenery at that spot. Both views require a wide-angle lens to get in a good picture; and it is rather difficult to get both foreground and distance, especially in the hazy weather which I had.

But I succeeded in getting two very pretty views by a plan which I strongly recommend in all such cases. Use a very small stop and a very sensitive plate. When you focus try for a line in the distance—such as the boundary of the lake; put down your sunshade so as just to shut out the distance to that line, wait for sunshine upon your foreground, and then expose for half-a-minute (or more if there be foliage), and take an instantaneous shot at the distance by just lifting the sunshade a few seconds before you shut up. By this means I got not only every mountain, but the clouds and sky. The day will now be so far advanced that northern scenery can alone be taken, and you must go to the upper end of the lake as fast as you can and work back, when fresh, pretty "bits" may be got of rocks, &c. But all the highest mountains and prettiest backgrounds lie to the south. I think by this means you may take as many lake views as you would care for in one fine day.

Two other spots must not be forgotten as presenting scenery of a totally different character. The wild mountain glens about the celebrated Gap of Dunloe, and the still wilder tarns on the top of the Mangerton range. And here I think my experience may be of use, for I suffered from the want of it. The Gap of Dunloe is generally "done" by taking a car for twelve dusty, uninteresting miles round the Lower Lake, quitting it to walk through the Pass, and returning by boat from the head of the Upper Lake. By this means you spend all the morning on the dusty road, and have the sun right in your eyes all through the Pass. I cannot say I at all thought the views worth the trouble and cost. So seen the Gap, to those accustomed to our English lakes, is really a very ordinary mountain pass. The Black Valley and best mountain scenery are only reached too late in the day for photographers. Let me, therefore, advise the tourist to take the journey just the other way. Get to the head of the Upper Lake, by boat or car, as early as he can, and walk up to the Gap or Black Valley from the south, by which means he will get the light on every picture, and will find some grand scenery.

With respect to Mangerton (the one *free* mountain on the eastern shore) by all means let him quit the tourist's path where the cars stop, and make *to the left* for the *lowest* of the four tarns as early in the day as he can. He will find some wild and grand scenery all the way up through the Horse's Glen to the Devil's Punch Bowl, and it will be all downhill home to a six o'clock dinner at the Muckross Hotel, which I strongly recommend, as in every respect preferable to the Lake Hotel or any other. One week, I think, will be sufficient for Killarney.

St. Vincent Beechey.

BENGAL PHOTOGRAPHIC SOCIETY.

RULES FOR THE EIGHTEENTH ANNUAL EXHIBITION, 1875.

1. The Exhibition will be opened in February, 1875, and will remain open for a month.

2. The Exhibition will be open to all good photographs contributed by members of the Society and by photographers resident out of India.

3. Only such photographs as have been taken within two years will be allowed to compete for the prizes now specified. No photographs may compete for prizes at more than one exhibition, and no prizes will be awarded to persons who have not actually taken the pictures which they exhibit.

4. The prizes will be awarded on the recommendation of three gentlemen appointed by the Committee of the Society, and the judges may in any case consider whether or not pictures attain a proper standard of excellence; the decisions of the judges will in all cases be final. The judges will be empowered to recommend the award of extra medals for photographs which they may consider of special merit, although not falling within the scope of the prizes offered as below.

5. Photographs intended for the Exhibition must be properly mounted, but need not be framed, and must be delivered to the Secretary by the 15th January *at latest*, accompanied by a memorandum describing the subject of the pictures.

6. The carriage of photographs sent from distant places must be prepaid. The Society will endeavour to have photographs which do not obtain prizes sold for the benefit of the sender, if request to that effect be made; but in such cases a price list must accompany the letter of advice.

7. Exhibitors must make their own arrangements for the removal of their photographs the day after the closing of the Exhibition.

8. Photographs, to which prizes shall have been awarded at the Exhibition, except local portraits, will become the property of the Society for distribution among members.

9. The Committee will select from the prize photographs two for distribution amongst members of the Society, and the exhibitors will be required to give up the negative of these pictures to the Society, or to enter into reasonable arrangements with the Committee for the printing of the necessary number of copies.

10. An admission fee of one rupee shall be charged daily to visitors of the Exhibition, members and subscribers excepted.

The following prizes will be awarded, viz.:—

By His Excellency the Viceroy.

Prize A—*a Gold Medal.*—For the best single photograph in the room.

This picture is to be chosen first by the judges, and then to be excluded from competition for any other prize. *Open to all comers.*

By The Honourable the Lieutenant-Governor of Bengal.

Prize B*—*a Gold Medal.*—For the best series of at least six photographic pictures taken either in or out of India by any member of the Society not being a photographer by profession.

By The Society.

Prize C—*a Gold Medal.*—For the best series of at least six landscapes taken and printed in India *by any member of the Society.*

Prize D—*a Silver Medal.*—For the best series of at least six portraits taken and printed in India *by any member of the Society.*

Prize E*—*a Silver Medal.*—For the best series of at least six photographic pictures, landscapes or portraits, taken either in or out of India *by any member of the Society* not being a photographer by profession, to be selected by the judges from those for which no other prize shall have been awarded at this Exhibition.

Prize F—*a Bronze Medal.*—For the best series of at least six photographic pictures taken in India *by any member of the Society,* to be selected by the judges from those for which no other prize shall have been awarded at the Exhibition.

Prize G—*a Silver Medal.*—For the best series of at least six photographs of Indian subjects, exclusive of landscapes and antiquities, taken *by any member of the Society.*

Prize H—*a Silver Medal.*—For the best series of at least six photographic pictures of Indian antiquities taken *by any member of the Society.*

By the President.

Prize I—*a Gold Medal.*—For the best series of at least six photographic pictures of any kind taken in Europe, America, or Australia, excepting those, if any, for which the Lieutenant-Governor's prize has been awarded. *Open to all comers.*

Prize J—*a Silver Medal.*—For the best series of at least six photographs of young children. *Open to all comers.*

By Captain J. Waterhouse.

Prize K—*a Silver Medal.*—For the best series of at least six landscape views taken out of India, to be selected from those for which no other prize shall have been awarded at the Exhibition. *Open to all comers.*

By T. H. Bennertz, Esq.

Prize L—*a Silver Medal.*—For the best series of at least six photographs printed in permanent pigments by the carbon process or any of the photo-mechanical processes. *Open to all comers.*

By G. L. Kemp, Esq.

Prize M—*a Silver Medal.*—For the best series of at least six photographs, reproductions of work of art, not smaller than 12 × 15. *Open to all comers.*

NOTICE TO EUROPEAN CONTRIBUTORS.

Packages of photographs intended for the Exhibition of 1874-75 can be forwarded to India† under the regulations of the Overland Parcel Post, full information of which may be obtained from the *Postal Guide*

* Members wishing to compete for Prizes B and E are requested to state whether they are in the habit of disposing of their photographs for profit.

† The regulations of the Overland Parcel Post only apply to packages sent from the British Isles to India, and *vice versâ.*

or at the offices of the Peninsular and Oriental Steam Navigation Company, Leadenhall Street, London.

They may also be forwarded from London through the agency of the "Ocean Express," whose London agents are Messrs. Nixon and King, 40, Regent Circus, Piccadilly, London, and 4, Agar Street, Strand. From Liverpool, through H. J. Simpson, Esq., of Messrs. Simpson, Lawrie and Co., Liverpool.

Messrs. Kaltenbach and Schmitz, of No. 1, Alderman's-walk, London, also of Liverpool, Hamburg, and Bordeaux, have arranged to make up parcels of photographs for the Exhibition, which will be closed and despatched from the above ports by the 1st November, 1874.

From Trieste, G. M. Rusca, Esq., will forward a parcel not later than the 10th November, 1874.

In order that the contributions may reach in good time, intending exhibitors are advised to forward their parcels from England not later than the 15th November, 1874.

Copies of the rules will be procurable from the above agents, and any further particulars will appear in the photographic journals.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 10........	Manchester	Memorial Hall, Albert Square.

PHOTOGRAPHIC SOCIETY OF VIENNA.

At the June meeting of this Society the chair was occupied by Dr. E. Hornig.

Amongst the first matters of any interest brought forward was a relief plate upon copper sent by M. Peter Mottu, of Amsterdam, accompanied by a number of prints. So far as may be judged by the specimens furnished with the *Correspondenz* the process is not a promising one.

Herr E. Riewel gave a description of his method of combination printing which he employed in group printing, and by which, when any figure in a group had by any chance come out badly, it might be replaced with ease by one from another plate. He exhibited samples.

Herr Haack described a plan for obtaining pure silver from the chloride, which was comparatively simple. The chloride was spread on an earthenware plate or slab, and a plate of silver or a silver spoon put into it. The slab was then placed in a vessel containing dilute sulphuric acid. It was then surrounded by a strip of zinc, which latter was connected with the silver plate amongst the chloride by a wire. Reduction of the chloride followed through the action of the electric current without requiring any help or watching. The fine-grained metallic silver which results may thereafter, when washed clean by water, be at once dissolved in dilute nitric acid without any trouble whatever.

Herr Schrank said that the reduction of chloride by means of iron or zinc was a much simpler process than this.

The Chairman said that Herr Haack's plan had the advantage of keeping the silver clean, and that, moreover, in the case of the old plan the silver would have to be fused with some oxidising agent before re-solution, which here was not necessary.

Dr. Hornig introduced Dr. Vogel's new book to the meeting with some appropriate words of praise.

A question was asked as to the advisability of using ribbed glass in the studio, and it seemed to be the opinion that the plan was good, the fluting breaking and softening the light.

There was no other business of importance, and the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

The last meeting of this Society for the session took place on the 3rd of July,—Dr. Vogel in the chair.

Several new members were admitted. Some of Herr Remelés pictures, taken in the African desert, were shown. The Viceroy of Egypt has ordered 110 albums (of sixty leaves each) of these pictures.

Herr Schaarwachter hinted that the Society's collection would be enriched by some of these views. There were many complaints that it was deficient in landscapes. Others, therefore, might well follow Herr Remelés' example.

The Chairman gave his new experience in the use of india-rubber and gutta-percha solutions as preliminary coatings of plates. The sample given him by Herr Prümm, which had not behaved well in his hands, he found to be very good—indeed better than his own. On the other hand, Herr Schaarwachter's preparation gave very indifferent results with him. The plates coated with it were easily injured. Possibly the gutta-percha used might have had something to do with it.

After some further discussion the subject dropped.

The Chairman proceeded to make some strictures upon the criticisms of Mr. M. Carey Lea and Dr. Monckhoven, to which we referred in our last number. He dwelt upon the fact that it was singular how much more sensitive dry plates that had colour in them were to the yellow rays than wet, and cautioned those who tried experiments that they must be very careful with the light. But there was nothing in the discussion which calls for a full translation.

Nothing else of any importance came before the meeting, which appears to have been very thinly attended, and the Society shortly broke up for the summer vacation, to meet again at the latter end of September.

Correspondence.

MY LAST HOURS IN FRANCE.—THE MORAL OF TWENTY YEARS' PROFESSIONAL EXPERIENCE.—SYMMETRICAL DOUBLETS.

I am afraid this will be a stupid letter, for the few ideas I had left after the fag of packing and removing last week have been drummed and trumpeted and cannonaded out of me by the gallant Marshal at the head of the French republic, who has been reviewing his troops immediately beneath my window—one which looks out upon the Champ de Mars, at Rennes. The affair was, of course, very brilliant, very noisy, very dusty, and very glaring, and half the population were out to see the fun. For my own part I hate military spectacles, and heartily wished the whole lot of them at—Berlin! Miss Thompson, however, would have been delighted; and M. Silvy, with his new panoramic apparatus, expressly contrived for war purposes, would have taken a whole series of instantaneous views, including 100 degrees of angle, sharp to the edges and corners, and have got a notice of the same in all the Paris papers.

But to anyone like myself who has enjoyed a seven years' residence in France, and has received a great deal of real substantial kindness from French friends, and who wishes them all the good in the world, and that their country may be prosperous and happy, these displays of military reorganisation, carried far beyond the point merely necessary for defensive purposes, must be painful in the extreme. It is the "dog returning to his vomit again, and the sow that was washed to her wallowing in the mire." Will people never learn wisdom by experience? Is history to go on for ever repeating itself?

But the noise is over, and the Marshal gone, and I have taken a stroll through the now quiet streets. The heat and glare are scarcely supportable; the tall white houses glitter in the sun, and the cool shade of the markets and churches invites one to enter and enjoy for an hour of calm the mere animal consciousness of existence. I have been in the fruit and vegetable market—all so fresh and fragrant. There are grapes from the vineyards of Redon, and figs deliciously ripe, and melons from Saumur, and apples and pears and peaches; the vegetables, too, looked cool and green and fresh. What a delicious world we live in! How bountiful dear Nature is in supplying us with every conceivable good thing! Why, then, cannot we be happy in it without cutting each other's throats and shooting each other down? Why cannot we all try to be good? What a mistake it is to be naughty!

I sat down upon an empty bench, with four large figs in a cabbage-leaf upon my knees, for which I had given a penny. I had never tasted better in Italy. An old woman, whose dealings were confined to herbs and vegetables, got up from her chair and offered it to me, whilst she got herself another, although she knew perfectly well that I was not going to be a customer of hers; but I looked a little worn and jaded, and she pitied me. I raised my hat and thanked her, precisely as if she had been the Duchess of Devonshire, and we got into conversation, and laughed and gossiped away for a nice, cool, fragrant half-hour. I told her all about Old England, and the fruits and vegetables we have there—the apples which nothing in the world can surpass, the beefsteaks which hardly require mastication, the mutton from the breezy downs, the glorious cod and soles and salmon, the "Cheshire" and "Stilton," the rashers of bacon, and the tankards of bitter ale; that there was no place, after all, like *Angleterre*; and that if she were in Covent-garden with her stall, all the *gamins* would call her "*ma tante*," and fall in love with her. The good-natured old soul shook her head and laughed, and we parted with mutual "*aux plaisirs*" and another respectful raising of the hat. Of course, I did not insult her poverty by offering her a penny for her chair. Why should the poor never be allowed to perform an act of kindness without being paid for it in coin?

Then I sauntered along the shady side of the streets, and looked into the shop windows for photographs, and finally entered a bazaar, where prices range from one *sou* to thirteen, and the things, I should imagine, must have been stolen ready-made, or they could not be sold at the money. I treated myself to a famous new spectacle case for twopence, and a magnificent toothbrush, with a brush at each end, for sixpence; and having thus wiled away another pleasant hour strolled on again—always on the shady side of the streets—till I came to the cathedral.

Churches in France are always open, except for an hour during the middle of the day, and you push aside the leather curtain at the doorway, enter and stroll about or take a chair. The coolness and shade on days like these are delicious; and when you have had your walk round, and have admired the architecture, the groined ceilings, and painted windows, and clustered columns, and carved pulpit, and high altar, and side chapels, and tall candles, and pictures of the crucifixion, and of martyrdoms of saints (just to remind you of what Christians have sometimes done to one another, and which pictures, I suppose, are hung there as a hint to you to temper your own fanaticism, whatever may be your creed, and go back to the simple precepts of the great Founder), you throw yourself into a chair, and give yourself up, as I said before, for another cool half-hour, to the simple pleasures of existence. It is possible, even, that you may fall asleep, for sublimity and contemplation cannot be long sustained; architecture becomes oppressive, gilding and ornament weary the eye, and exhausted nature demands a *siesta*. By and by you are aroused by a tap on the shoulder. Is it the most reverend the Archbishop of Rennes, who has come to discuss with you the thirty-nine articles, and to prove to you to demonstration that Protestantism is the abomination of desolation? No; it is an old woman—but not your good old soul of the market; she demands of "*monsieur*" a *sou* for his chair, and looks as if she meant to have it. Long sojourn in that sublime place has soured her visage, and you pay her, and soon find yourself on the stroll again in the hot, glaring streets.

Ices are not to be had for love or money—why I cannot say—and pastry you never touch, of course; so, avoiding the pretty shops of *patisserie* and *bonbons*, you enter a *café*, and take your seat at a little round, cool, marble table. You hear the crack of billiard balls in another room, and see Frenchmen about you at similar tables, sipping *café noir*, or Strasbourg beer, or absinthe, or vermouth, whilst their wives are busy at home. The last-named beverage, mixed with water, would be very refreshing if you could but drop a lump of ice into it, for it is a sort of bitter sherry; but we are in Rennes now, and not in Paris, and ice is not to be had anywhere, so you order some *sirop de groseille* and *eau de seltz*, and once more try to make yourself cool and comfortable. The effort is quite successful, and you find these hot, glaring days of idleness in France very enjoyable. You become reduced to a state of mind in which even a game at dominoes would give pleasure, and you feel impelled to grasp every Frenchman by the hand, and cry "*Vive la France!*" "*Vive la Republique!*" As for writing and experimenting and photographing, dear friends, it is a delusion to think of such things at this season—they are simply impossible. If I have ever persuaded you to come to France just now with your camera, forgive me, for I was wrong. I over-estimated the powers of poor human nature. Come to France by all means, for it is most enjoyable, but leave your camera behind you.

Of course, being at Rennes for a few days, I am staying with my kind friend Monsieur Mévius, whose photographic establishment, as I have already told the reader, is one of the finest and best appointed in France. His rooms are all cool and nice, and indoor work in them is possible, although printing is rather trying to the nerves and the negatives. His studios are beautifully lighted, and neatness and order prevail in every department.

We were sitting moralising together the other night over our coffee, and, as the result of twenty years' experience in professional portraiture, he said he had now come to the conclusion that it was not commercial wisdom to strain at too many different processes. Let your enlarging, enamelling, &c., be done by persons who make a special business of these departments, and send your negatives to them. In short, adopt the principle of the division of labour, and confine yourself to the operation of taking the original *carte* or cabinet as well as you can. Do not buy solar cameras, heliostats, enamelling apparatus, carbon printing gear, and licences for this, that, and the other. He speaks feelingly, for he has spent a great deal of money in this sort of way; and in his present conviction he is most probably right. The photographic journals have, no doubt, done a great deal of good; but, on the other hand, I fear they may have induced some professionals to fool away lots of money. Let there be division of labour in photographic portraiture, as in everything else. The blending of art with photography is just now the fashion. Then let the artists do their part, and the photographers theirs, each in the best way he can, and one for the other.

Both our "Peripatetic" friend and one of our Editors have been tasking me lately with changing my opinions respecting the symmetry of doublet view lenses. But they are mistaken here, and I am much surprised that my meaning should have been so completely misunderstood. Having given reasons why symmetry should be best, and those reasons not having received a reply, is it likely that I should turn round myself and recommend the very opposite, particularly when my opinions have been held consistently for a dozen years?

My meaning was simply this:—If you want a doublet view lens to do one thing, and one thing only—that is to say, to take a view of a certain size, with a given focal length—make it symmetrical, because it will work with a larger stop than an unsymmetrical compound of equal focus. But if you want, for the sake of convenience, to make the same mounting serve for a number of different combinations of different focal lengths, you must, of course, employ unsymmetrical arrangements.

With respect to the larger lens being put next to the view, in order to correspond to the law of conjugate foci, I do not think the reasoning sound, as any one may prove for himself by reversing the combination. The difference of definition in the centre, which ought to be great according to this doctrine, is scarcely appreciable between the two systems. Push the theory to its limit, and the front lens ought to be as big as the side of a house, in order to be adapted to the law of conjugate foci—for one of these foci, in a view, may be ten miles distant!

Rennes, August 22, 1874. THOMAS SUTTON, B.A.

P.S.—I must add a few words of postcript dated from my native land, having left Rennes on Monday, the 24th instant, and crossed from St. Malo to Southampton the following night.

From Rennes to St. Malo is classic ground, for a man of genius has left his footprint upon the soil. Stop at the station at Combourg, walk up to the old chateau, put yourself into the hands of the attendant, and he will take you into the hall where Chateaubriand and his sister, when children, used to sit for hours silently conversing with their eyes, whilst their gloomy sire—the old noble whom the revolution had despoiled of all but his loyalty and his honour—paced the solemn chamber with solemn steps. Take your camera with you, by all means, if it should be amongst your luggage, for there are many subjects here full of interest, if not to the busy public, at any rate to those who can bestow a thought upon the past.

At St. Malo we are privileged to gaze upon both his birthplace and his tomb. We may sleep at the *Hotel de France*, in the very room in which was born Chateaubriand; and we may cross the sands to the Grand Bey, and ponder by the side of those iron rails which enclose the favourite spot where he sat and pondered when a boy, and where his mortal remains now lie beneath a granite slab and cross, upon the verge of a precipice, washed by the waves and battered by every gale. An hour in such a spot is worth many an hour of ordinary life. A whole career—a strange and a brilliant one—passes in review before us, much of it related in his own sad and eloquent words. We see him as a child running wild with the *gamins* of the place, rioting in the waves, digging holes in the sand, but ever fond of solitude, and slinking off to his favourite spot upon the rock looking out upon the sublime and boundless sea. Then we follow him to Combourg, and thence to the New World, where visions of sable beauty laid the groundwork of romance. From the far west we follow him again—a traveller, but now amidst the ruined temples of the east. We sympathise with his passionate grief at the death of Madame Beaumont. We are with him as an exile in London, and again when he enters London as the ambassador of Louis XVIII. We are with him during his last years, when he is consoled for the loss of all earlier friends by the friendship of the beautiful Récamier; and we are with him when his body is borne to its last home upon the rock—where he had sat so often when a boy—by all the civic authorities and half the population of St. Malo.

But what, after all, is there in this man's career to so deeply captivate the fancy? Is it because by his *genie du Chrétienisme* he restored Christianity to France? or is it because he was the constant foe of Cæsarism and selfishness? No! It is because he was endowed with that subtle fire called "genius," and left behind him a few pages of printed matter which will strike a chord in the human breast to the end of time. It is the genius of *sentiment* which so captivates the fancy in the life and writings of Chateaubriand. Look in his portrait at those deeply-solemn eyes, and you behold there the secret of the mournful style of his eloquence, which beautifies with a bewitching sadness everything that it touches, and captivates your heart. But take care, gentle reader, as you think of all this, with your hand upon those iron railings at St. Malo, for if you lose your hold in a moment of enthusiasm you may fall a hundred feet into the sea.

But what has all this to do with photography? Just this much:—When we feel inclined to engage in angry disputes about little matters of invention in our hobby, let us pause and reflect how trumpery are all these "fads" and processes when compared with art and its triumphs, and how small the gleam of light which a real discovery in photography sheds over the world in comparison with the trail of glory which the fire of true genius leaves behind it.

I left St. Malo at five p.m., in the midst of heat and glare, and saw the sun set amongst the Channel Islands with "all heaven to himself." It is solemn to see the curtain of night drawn upon the great sea, and to feel that you are creeping upon the bosom of a monster who can be all-powerful in his wicked moods; and it is solemn to see the flash of the new lighthouse upon the Roches Douvres—the scene of Victor Hugo's *Toilers of the Sea*—and the ruddy glow of the new light upon the Corbiere.

But what has become of the sun since then? I have only seen it for a brief hour on Tuesday, twinkling through the gloom "like a drunken man's dead eye in maudlin sorrow!" What has become of him? and what is to become of me and my experimenting in Old England if *this* be the climate for which I have exchanged the glorious sunshine of France? I begin already to congratulate myself most devoutly that I have only taken my Welsh house for a year. It is thirty years since I lived in England, and I had forgotten what poor dear Old England is in respect of gloom.

It is hard when the printer misunderstands one's bad writing, but harder still when he puts his blunder between inverted commas. For "fresh," at page 405, read *forest*.—T. S.

Chester, August 27, 1874.

ACKNOWLEDGMENT.

To the Editors.

Gentlemen,—Absence from home has prevented me from writing earlier to thank Mr. Webster for his courteous reply to my queries.

His last hint in his second paper I most thoroughly endorse, and I am sure your readers will agree with me in thinking that his two contributions form a most valuable addition to our literature on permanent printing.—I am, yours, &c., Carbon.

Oxford, August 31, 1874.

NEGATIVE BATHS.

To the Editors.

Gentlemen,—After nearly thirty years' experience of landscape and portrait photography in Great Britain and America—often crossing the Atlantic twice a-year, and while in America often making the journey from 12° below zero in Canada to 80° in the shade in south and central Florida, the double journey lasting about five months—I have never, during twelve years, been for one day so situated that I could not at any time take a good, saleable photograph in thirty minutes' notice; and I have, on an average, taken five 10 × 12 negatives per day the year round, and often with the thermometer standing at 104° in the shade.

My plan is not new—at least I think I got the idea somewhere. I make up a new bath, after Mawson's formula, of the quantity of eighty ounces of solution, thirty grains to the ounce. After I have used up a pound of collodion in sensitising plates I add distilled water to make it up to the original bulk, filter, and add the silver to make up the strength, which I ascertain by the argentometer. A drop or two of nitric acid is sometimes needed to show a trace of acid in the solution. I work with this renovated bath until one ounce of alcohol in sixteen ounces of developer will not flow evenly, which differs a little according to the time allowed for the ether and alcohol to evaporate before immersing the plate in the bath. I have succeeded in working through two pounds more collodion, which usually represents eighty 10 × 12 plates (forty to the pound of collodion); but, at the same time, when I renovate my old bath I make a new one, and the moment the old bath will not allow the developer to do its work I set in the new bath at the back of the old one in my tent (which is made to carry two baths), and as soon as the plate is coated in the old bath I take it out with the dipper and place it in the new one until the greasy appearance leaves it. I immediately reduce the amount of alcohol in the developer to one-half the former amount, daily increasing it again as the development requires. I work away with the two until the time required for exciting the plate occupies over four minutes in the first old bath, which generally uses up one and a-half pound of collodion ere it arrives at this point; I then discard it entirely, put the second bath in its place, and replace the second by a new one.

The advantanges I find in working two baths are very great. First, the plates are more sensitive, seldom requiring re-intensifying. Secondly, I get clear of all water waves or marks. In the third place I secure a free flow of silver on my collodion surface, doing away with oyster-shell markings, which are caused by using too newly iodised collodion, and containing too much gun-cotton for the strength of the silver bath. And last, but not least, a plate prepared in the above way will keep good from one to three hours with a damp blotting-pad behind it in the dark frame.

I claim nothing new or novel in my method of working, and all new beginners should be thoroughly convinced that good results can be got with almost any formula; still, there are many things recommended that do not always answer the desired end. For example: with nitrate of barytes I have not succeeded in getting rid of pinholes in negatives; but nearly always can get rid of them by the addition of a little lunar caustic as a strengthener to the bath when only using one bath. With two baths pinholes never occur with me. I do not filter my baths oftener than once for every pound of collodion used, and generally set them in the sunlight during the whole of Sunday.

The presence of oxide of iron in the water used for the developer I find to cause fogging. This I have often experienced when using water from iron tanks, bogs, or mineral mountain streams.—I am, yours, &c.,

August 31, 1874. A. G. Grant.

ALCOHOLIC BATHS.

To the Editors.

Gentlemen,—While having some doubts respecting the wisdom of calling attention to misinterpretations or misrepresentations, whichever suits the case, I make the venture with an "Old Hand," trusting he will pardon the foolishness (if there be any) when he is reminded it is not the last straw which breaks the camel's back, and that it is somewhat singular his is not the first misinterpretation regarding what I have said on baths.

The originality of adding alcohol to a new bath I never claimed, but mentioned one who, years ago, advised it; therefore, the assumption of "Old Hand" that I started a "new idea" in which "there is nothing new" is not borne out by facts. My experience of this wicked world has left me sufficient honesty as a component part of my nature not to obtain the ideas of others and vaunt them as my own, be they alcoholic baths, albumeno-acido developers, pyroxilinate of argentic chloride, &c., &c.—in short, to avoid so acting in the mental as would entail imprisonment in the material world.

Of the addition of alcohol to the bath I said—"Practically, under these circumstances, the addition of alcohol is right, and theoretically so, too, *if it were an advisable thing to accumulate in the bath.*" Here I introduce italics for the first time, because previously I thought there was not a new or old hand in the profession who had any doubts on this italicised portion; however, it appears that in so thinking I was in error.

In saying my last on this subject I also make another venture that may be thought unwise by "Old Hand," and it is to subscribe myself by that name which I have not yet had any reason to withhold.—I am, yours, &c., W. E. Batho.

Blackpool, August 22, 1874.

Miscellanea.

A Good Artistic Pun.—When the late Mr. Solomon's remarkable picture, *Waiting for the Verdict*, was exhibited at the Royal Academy it took the world by surprise. Amongst the spectators was Thomas Landseer, the engraver, brother to Sir Edwin, and a few congenial spirits. *Waiting for the Verdict* was hung above the line, but the Royal Academicians had their own pictures, of course, exhibited on the approved level. Tom Landseer was in ecstasies with the young, and up to that time undistinguished, artist's work, and, waving his hand towards it, exclaimed—"There is Solomon in all his glory; but not R.A.'d (arrayed) like one of *these*" (pointing to the paintings of the favoured academicians).

A Photographic Studio Destroyed by the Falling of an Adjoining House.—On Saturday last, at the Driffield County Court, before Mr. F. A. Bedwell, a suit was brought by Mr. Matthew Boak, photographer, Driffield, against Mr. John Berry, builder, of the same place, for the recovery of £50, reduced damage sustained by him by the falling of a house, for the building of which the defendant was the contractor. Dr. Rollit, of Hull, appeared for the plaintiff, and Mr. Jennings for the defendant. In evidence it was proved that on seeing the plans of the intended building Mr. Boak (the plaintiff) objected to them. The house was only intended for two storeys, but it had been arranged for three. Between five and six o'clock on the evening of the 18th January the house had the whole of the roof on, but not the slates. He heard the building fall. The gable ends and chimney had tumbled down, and the roof was sticking out. He attributed the fall of the house to its bad construction. The gable ends had been left in an unsafe state. The bricks were "plummed" instead of being bonded, and the chimneys built from above. The north gable fell upon his studio, which it crushed, and destroyed 500 negatives, smashed a brougham worth £20, and other injuries, by which he sustained damages, on a reasonable calculation, amounting to £78. He had had several interviews with defendant about his loss, but defendant had said that he would not pay a —— penny, and when he got the summons he was fifty times worse.—Mr. Wellstead, of Hull, photographer, proved that the claim for damages for loss sustained in the destruction of the negatives and other things was a fair and reasonable one.—Mr. J. F. Shepherdson, of Driffield, builder and architect, also gave evidence with regard to damage sustained, and stated that a properly-built house would not require stays. He had a new building on the top of a hill at Tibthorp, a few miles off, and not a tile was blown off it on the evening in question.—The defence set up was that the accident was caused by the strong gale which blew on the night referred to.—His Honour summed up, reviewing the evidence. It devolved upon the defendant to show that he used the usual caution to be prepared against winds which might be anticipated. It was necessary for the defendant to show that the house fell owing to higher power than he could control. The case was one of importance to the public. It had not been shown to him that on the night in question any serious damages had been done to any other buildings in the town, and he must give a verdict for the plaintiff—damages £50.

EXCHANGE COLUMN.

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

For telescope astral, watch, or musical box I will give in exchange a solid balcony and folding square pedestal, handsomely mounted, and plaster vase to match. Cost £3.—Address, C. H. Free, photographer, Hull.

ANSWERS TO CORRESPONDENTS.

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

A. D.—The cost will be five shillings.

J. S. Hailes.—The letter has been forwarded.

B. Jones.—Yes! M. Claudet is much missed. The visit was a very pleasant one. Mr. Bolton will doubtless communicate with you.

Henry Lamberts.—We are unable to decipher your writing so as to understand clearly your requirements. Write more legibly.

Andrew Macnair.—1. Apply to Whitehead and Brothers, 14, Hanover Street, Long Acre, London.—2. Immerse the plates in a hot and strong solution of common washing soda.

B. C.—The book might have been made exceedingly useful; but it is in reality one of the most worthless ever published in connection with photography, and that is saying a good deal.

J. F. Newland.—The most suitable colour for the opaque side of your studio is, in our opinion, French grey. This will reflect a fine soft light upon the shadow side of the sitter, and, at the same time, will not be distressing to the eyes.

H. B.—Clouds are usually produced in a photographic landscape by printing them in from a separate negative. Had you been an attentive reader of our "Answers to Correspondents" you would have seen a similar query answered in a recent number.

The Enamel Process in America.—From a letter received from Mr. W. T. Watson, of Hull. we learn that a patent has been granted to him in the United States of America for his process of producing burnt-in enamels, and that already several leading photographers have obtained licenses for practising it.

George Way.—Starch is considered to be the best test for free iodine. Let a piece of paper be sized with starch, and immerse a slip of this in the liquid supposed to contain iodine. If there be any present the paper will immediately become of a purplish-blue colour, owing to the formation of iodide of starch.

Rev. B. J. S.—The angle at which you have inclined the mirror is not the best for securing the greatest amount of light that can be reflected. Let the incident and the reflected pencil form a much more obtuse angle than that shown in your diagram, and the result will be a great addition to the intensity of the light reflected.

R. L Jones (Brockley Court).—Do not wash off the developer until a considerable degree of initial intensity has been obtained; then wash thoroughly, and apply the intensifier—composed of pyrogallic and citric acids and silver—described in our Almanac. By adopting this course you will most assuredly obtain sufficient intensity; after which you may fix.

Roger.—By a restrainer is meant nothing more or less than what the term implies, viz., something that restrains. In photography it is usually applied to some substance mixed with the developer to restrain its too rapid action. Gelatine, acids, and bromides act in this manner, preventing the deposition of silver on those parts of a sensitive surface which have not been exposed to the action of light.

Querist.—To clean your old collodion bottles pour into the first of a series a small quantity of nitric acid, replace the stopper, and shake until the film becomes detached; then pour the acid into the second bottle, shaking as before; and so with respect to the whole six. Of course each must be thoroughly well washed with water after the acid has been removed.

A Lithographer.—1. While we should like to oblige you, we really could not undertake to write and publish a "practical article" on photolithography for your sole benefit. Enough has already been published in former volumes of this Journal to enable any person to acquire a knowledge of not merely the principles but the practice of photolithography.—2. The production of the surface blocks about which you inquire is a trade secret.

R. H. O.—A Ramsden eyepiece is the best form of magnifier with which to focus; but we do not think it will prove so suitable for you as a watchmaker's ordinary horn eye-glass, because for packing up in a small space the latter has decidedly the advantage, and to a tourist bulky instruments prove an inconvenience. Further: by dint of a little practice a glass of this kind may be held quite firmly by the muscles surrounding the eye, and thus both hands are left at liberty while the view is being sharply focussed.

"W." is in trouble with his bath. He says:—"I have two baths made in the ordinary way. When one, the oldest, is in use, the developer flows easily, and leaves a clean negative; with the other, which is nearly new, wherever a little of it is not completely drained off white opaque patches are deposited immediately on the application of the iron developer. Where the negative has been completely drained there it is all right, but the developer flows badly. It does not matter how wet with bath solution the negative is with the old bath, all goes right; but with the other it would be covered with a white marbled coating, densely opaque. Before development *both* plates would look well, the same developer being used to both. The silver in both cases was bought at the same place, and, I think, from the same stock. The iodide of potassium in each case was out of the same lot; but it got slightly damp once, and I dried it with gentle heat in the oven without removing it from the bottle. The acetic acid was the same in both baths. The developer has a little sulphate of copper in it, and is about two months' old."——Assuming that our correspondent is correct in saying that both baths are made from the same sample of silver it follows that there must be something wrong with the water of which the new one was made. In reply to other queries—2. Do not acidify the prints.—3. Alter the method of working by not subjecting the prints to such a severe washing previous to toning, and by discarding the toning bath now being used in favour of an acetate one.

Pictorial Effects.—Since publishing in our columns two weeks since (page 405) his method of producing pictorial effects without a background, Mr. Werge has elaborated his instructions and printed a sheet of detailed directions, which every reader ought to send for. We make an extract from it:—"Take the sitter against a dark background, and finish the negative in the usual way, but do not varnish it. Allow the negative to dry, wet it again, and pour over it the sensitive mixture of dextrine, &c.; drain, and dry over the spirit lamp (or, better still, lay the negative on a hot-water drying-bath in the dark room, or by lamp or fire light). When dry, and while still warm, place the pictorial negative from nature, or from an engraving or painting, in contact with the other negative, face to face, and expose, pictorial negative uppermost, for about twenty minutes in a strong light. Then take the negatives into a dull white light, or strong yellow light, and remove the pictorial negative without scratching. Lay the portrait negative on a retouching desk, and apply the plumbago all round the figure with a camel's-hair brush until the pictorial background appears, and is dense enough. If there should be any difficulty in obtaining sufficient density breathe over the part, but be careful not to spot or touch the surface while the vapour is upon it. As soon as the vapour has evaporated apply the plumbago again, and the picture will soon become visible and dense. Then dust off all the superfluous plumbago, and varnish as usual." In addition there are appended a formula for the preparation of the sensitive mixture, and, what is of not less importance, a list of prices of the various materials required ready for use.

METEOROLOGICAL REPORT,

For the Week ending September 2, 1874.

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

These Observations are Taken at 8.30 a.m.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
27	29·96	W	57	60	75	49	Dull
28	29·93	NW	55	58	70	50	Cloudy
29	29·90	W	56	59	67	49	Cloudy
31	29·90	W	58	62	73	57	Cloudy
Sept.							
1	29·82	W	63	69	74	57	Cloudy
2	29·98	W	57	60	—	52	Cloudy

CONTENTS

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 749. Vol. XXI.—SEPTEMBER 11, 1874.

ACIDS IN THE DEVELOPER.

One of our contributors, Mr. D. Winstanley, in our numbers for the 14th and 21st of August, demonstrates that the amount of acid generally used in developers is more than necessary, and draws the inference that the probability is that it is not necessary at all—that fogging, so-called, is not necessarily an accompaniment of development without acid. A thirty-ounce bath was used, containing only one drop of nitric acid in the whole and having twenty-five grains of silver in each ounce. It was in working order, having received three or four plates; each plate, however, must add to the acidity of the bath. The developer was a plain iron developer—one drachm of sulphate to four ounces of water. This also was acid, although very slightly so. The conclusions arrived at, after performing some experiments, were—1. That the addition of acid to the developer is unnecessary to prevent fogging. 2. That an addition of acetic acid to the developer does retard development, but does not increase the density of the deposit.

No doubt these experiments will surprise and change the ideas of many practical men with whom the necessity of an acid developer had become a confirmed superstition. The acidifier will also probably be used more sparingly than hitherto, and more as a controller than as a preventive of fogging.

But we do not think the photographer will be able to dispense absolutely with the use of acetic acid, for a cause which, perhaps, is hardly appreciated or perceived will, more or less, necessitate its use. The writer of the article in our number of the 14th of August approaches it when he observes—"I am not yet prepared to say that, with all the chemicals in an absolutely neutral condition, such results are to be obtained" [a good negative obtained with an absolutely neutral bath]. "but it does seem to me not improbable that the chief use of acids in the photography of the past has been in counteracting the effects of those numerous impurities with which the photographic chemicals of the time seem to have been particularly infested." Now, certain impurities are part and parcel of the substances, and a basic condition of protosulphate of iron is one of the specimens of an impure chemical that can never be guaranteed against, namely, the accidentally-impure condition. It is always undergoing a process of oxidation, and, therefore, always becoming basic in its nature. Strange to say, however, an acid reaction with test paper is not a proof at all of its condition as regards neutrality; thus, anomalous as it may seem, we can have a basic solution of an iron salt which shall give acid reactions.

First of all, let us consider how an iron salt becomes basic by oxidation. The formula of the green crystals of protosulphate of iron is $Fe\,SO_4\,7\,H_2\,O$. When recently made the molecules are all protosulphate of iron with a slightly-acid reaction, from the fact that the sulphate is made by acting directly upon iron wire, nails, or hooping. The hydrogen evolved from the reaction reduces this salt to its lowest stage, thus:—

$$\underset{\text{Iron.}}{Fe} + \underset{\text{Sulphuric acid.}}{H_2\,SO_4} + \underset{\text{7 Water.}}{7\,H_2O} = \underset{\text{Ferrous sulphate.}}{Fe\,SO_4\,7H_2O} + \underset{\text{Hydrogen gas eliminated.}}{H_2}$$

Therefore, the result of this reaction must be a pure ferrous salt, the crystals being generally formed from a well-marked acid solution; and, as they generally retain mechanically a trace of the mother liquor, we can easily understand a recently-prepared crystal not only being pure, as regards its ferrous condition, but, if anything, slightly acid. This state of affairs does not last long, however.

The stable condition of iron salts is the per- or ferric-salts, and the protosalt, whether in the form of a crystal or in solution, is continuously absorbing oxygen. When this change has proceeded to any extent it can be detected by the eye, in the yellowness assumed by the green crystals, or the brownish tinge which the solutions assume—the ferrous salts being perfectly green in colour, whilst the ferric salts are yellow. But the eye fails to detect a small quantity, and thus it cannot be used as a criterion of the purity of the salt. In assuming the ferric condition a neutral salt of iron becomes more or less basic, because there is not a sufficient quantity of acid present in the original molecule to satisfy the equivalency of the ferric molecule. If the oxide of iron exhibited the usual phenomena which are generally classed under the head of alkalinity, such as affecting litmus and turmeric paper, we should get alkaline solutions; but, as the oxides of iron are neutral in this respect, no such reaction is exhibited.

We thus see that we may have a strongly basic salt which shall still be acid in its reaction with litmus paper. The excess of hydrated oxide of iron produced is not precipitated without a large quantity being present, or heat having been used. The following equations will illustrate why there is an insufficiency of acid present to make a perfect salt upon the oxidation of ferrous salt:—

$$\underset{\text{Eighteen molecules of ferrous sulphate.}}{18\,Fe\,SO_4} + \underset{\text{Oxygen + }9H_2\,O}{O_9} = \underset{\text{Six molecules of ferric sulphate.}}{6\,(Fe_2\,3\,SO_4)} + \underset{\text{Three molecules of hydrated oxide of iron.}}{3\,(Fe_2\,O_3\,3\,H_2\,O)}$$

It is, therefore, evident that for every eighteen equivalents of a prosalt of iron which are oxidised there is a deficiency of three equivalents of acid, which fact results in the production of a like number of equivalents of oxide.

Now, how far this basic developer would affect the undeveloped picture is a question of some importance. Its tendency would probably be much of the same character as if we used an alkali like potash or ammonia; that is to say, it would act as an abstracter of the acid or stylous element, and thus produce fogging effects. If we cannot depend, therefore, upon the neutral condition of the developer, it is more natural to suppose that the presence of an acid, which would not be sufficiently powerful to interfere with the latent image, would always ensure that condition which is essential to a picture free from fog. Salts of iron will take up any reasonable amount of the basic salt and hold it in solution, providing heat is not employed. If, however, we heat such a solution, any great excess results in a precipitate. If a basic solution of nitrate of iron be added to a neutral solution of nitrate of silver a precipitate is produced, showing that these remarks are not based upon theory, but are actually demonstrable by experiments. This is best seen by treating a solution of nitrate of iron with hydrated peroxide of iron in the cold, filtering this solution, and allowing a weaker solution of nitrate of silver to float upon the surface. At the line of juncture a basic precipitate will be perceived.

As regards acetic acid acting as a retarder or accelerator: some very curious and contradictory observations have been made upon this subject, and it is one which requires clearing up. It should, however, be borne in mind that the probable impurities of acetic acid—namely, aldehyde, formic acid, &c.—may materially affect this question.

LENSES FOR BINOCULAR CAMERAS.

In the editorial articles on cameras in our last Almanac there was an idea referred to in connection with the above subject, but in such a brief and passing manner as to warrant our return to it for the purpose of treating the subject in a more elaborate manner. The theme is one most intimately connected with the economics of photography, seeing that we are about to describe in a practical manner a method by which one lens may be made to do effectively the work of two.

In the article to which allusion has been made was shown what is termed a "double-width camera," working with only one lens, which, being screwed upon a front capable of being moved horizontally within guides, serves the purpose of taking two pictures upon one plate, the camera being divided into two by means of a vertical partition.

The annexed diagram shows, better than any mere verbal description could do, the nature of the movement. The advantage of a

sliding front of this description may be inferred from the following remarks addressed to us by a well-known gentleman, a member of the Amateur Field Club:—"I have," he says, "a very fine and costly double-cemented combination, which, when used with a stop, covers my 8 × 5 plate most perfectly. I would have liked to have a fellow to it for stereoscopic purposes, but do not feel justified in incurring the expense, even if I were sure of getting one that would match it precisely; while the weight and bulk of such another lens, when travelling about, is also a matter for consideration. By the adoption of a sliding front, I find that I can by the one lens take either a single view upon the entire plate or a stereoscopic pair by giving two exposures—one with the lens moved to each side of the camera. I find not the slightest inconvenience resulting from this."

To the foregoing we must add a few words. The objection may be offered that as both pictures are not taken simultaneously they cannot be alike, owing to figures which were stationary in one having withdrawn previous to the taking of the other. This objection is quite plausible, and we admit it to the full: but it is unfortunately susceptible of being applied to photography practised under *every* condition but one—that of instantaniety. Even if an exposure of five seconds were all that was required to secure a picture—the subject being a landscape, a street scene, a coast or marine view, or, in short, anything in which life is represented—how many are the chances that some portion of the living objects embodied in the scene would have exercised the powers of locomotion, and that which was stationary at the commencement of the exposure have disappeared at its termination! What is true of the taking of one picture under such circumtances is, doubtless, still more so when two photographs are to be taken, one after the other. For the depicting of scenes of this character nothing will answer but an instantaneous exposure, and in the case of stereoscopic pictures the exposure must not only be instantaneous, but simultaneous; hence this objection is thus summarily disposed of. Instantaneous binocular pictures of the nature indicated demand the use of a *pair* of rapid-acting portrait lenses, and nothing else will answer the purpose.

But for any subject where complete immobility can be secured for a minute or two, or even for a portion of a minute, the optical conditions become altogether changed. To say that the latter class of subjects forms the preponderance of what is selected for binographic representation is to affirm that which every reader knows to be the case; but what we particularly desire to assert is that when photographing subjects of this class it is, practically, quite immaterial whether the exposures of each view be made simultaneously or one immediately following the other. This once determined, we are at liberty to proceed farther.

There are few photographers who have not lenses of different foci which can be screwed into one flange. To possess a variety of lenses as respects focal length is not only a most excellent thing, but it lies on the borders of necessity, especially if the photographic artist aspire to be master of the pictorial situation; so that, having selected his standpoint, and having his subject before him, he can, by aid of the optical means at his command, determine whether a particular portion of the subject should occupy the whole or only a predetermined portion of the plate. *This* is the great advantage gained by having a variety of lenses. Such advantage we ourselves, in common with many others, possess, but we do not possess it in duplicate; hence for the binocular depicting of scenery the whole of the lenses would be useless were it not for the sliding-front arrangement. By the latter arrangement, however, we can do almost anything. Should the varying distances and the general nature of the subject be such as to bring it within the category of pictures requiring stereoscopic projection, all that is required is to insert the diaphragm or division in the camera, slide the lens first to one side of the camera and expose, and then push it towards the other side, repeating the exposure. On the other hand, if a monocular view be thought more desirable, the lens should be moved to the centre and the division removed, and a single view may be obtained.

With regard to the mechanical phase of this method of taking pictures it will not be necessary to say much. A pair of guides placed horizontally on the front of the camera are, of course, indispensable. Within these guides slides the wooden front on the centre of which the lens-flange is screwed.

At first sight it might be thought, and probably will be said, that the horizontally-sliding front, or lens carrier, must of necessity be very long, so that, when the lens is moved nearly opposite to the centre of half the plate, the oblong aperture in the rigid front of the camera will be so thoroughly covered as to prevent the ingress of light. Well, it must certainly possess sufficient length to do this; but, upon measurement, it will be found that this can be done without any existing necessity for making the sliding front any longer than the width of the camera; in other words, not a single inch is lost with respect to having to increase the bulk of the camera by the projection of the front, while everything is gained. This is a case of "all gain and no loss." It is too obvious a matter to require special mention, as a precaution, that stops or buttresses must be placed on the permanent front to prevent the movable piece from being pulled too far to one side.

If the landscape photographer will have a sliding front attached to his camera—which he may have done at a very small pecuniary outlay—he will then discover that by adopting the method we have just described his lenses will acquire a new power—that of securing binocular views of any place which courts stereoscopic representation, and that without the necessity of the photographer possessing *pairs* of lenses specially selected and matched for the purpose.

In conclusion: as a lens which has to cover only one half of the plate for which it is intended can be worked with full aperture, it follows that, as respects rapidity of exposure, such an advantage is necessarily gained in taking binocular views, the exposure required for both being really much less than that required for the single view covering the whole plate; hence the double exposure is in reality briefer than the single one.

The intelligent reader will already have concluded that by the arrangement here recommended it will be possible to take two entirely dissimilar views upon one plate, instead of two different views of the same subject. This is quite true; we possess several charming little 5 × 4 views taken in this manner.

ACETIC ACID.

Amongst the chemicals in daily use by photographers generally there are few which are so important as that which heads this article, and still fewer, perhaps, about which there is in the minds of many who use it largely so much confusion of ideas, arising, doubtless, from the various strengths in which it is found in the market, and the different names or designations by which such varieties are known.

Acetic acid is said to have been found in small quantities in several vegetable and most animal tissues, although there seems in the minds of several authorities some doubt on the subject. Be that as it may, it is quite certain that, in practice, it is invariably obtained by the natural arrangement of its elements—carbon, hydrogen, and oxygen—consequent on the breaking-up of various organic compounds. Probably the most interesting method, from a chemical point of view, and one most generally adopted—at least for the production of the weaker acids—is that known as the acetous fermentation, in which alcohol is the body operated on, and oxygen the operator or source of change. The alcohol is first converted into aldehyde, by an atom of oxygen uniting with two atoms of its hydrogen to form one atom of water, and then the aldehyde unites with an additional atom of oxygen and becomes acetic acid, as will be readily seen from the following equation:—

$$\underbrace{C_4H_6O_2}_{\text{Alcohol.}} + O = \underbrace{C_4H_4O}_{\text{Aldehyde.}} + \underbrace{H_2O.}_{\text{Water.}} \quad \underbrace{C_4H_4O}_{\text{Aldehyde.}} + O = \underbrace{C_4H_4O_2}_{\text{Acetic acid.}}$$

When wood, especially such hard woods as oak, beech, ash, and birch, is subjected to what is called destructive distillation—that is, to a high temperature in an iron retort—there comes over, along with a quantity of inflammable gas, a very complicated liquid, consisting of tar, pyroxylic spirit, and pyroligneous acid. This acid liquor is pumped from the heavy tar, which settles at the bottom of the vessel, and turned into a still, in which it is subjected to fractional distillation, the pyroxylic spirit coming over first, and then the pyroligneous acid, leaving in the still a residue of English asphalt or pitch. The crude pyroligneous acid thus obtained is converted into calcium acetate by the addition of milk of lime, and the solution evaporated to dryness and partially roasted, by which means most of the remaining tar and other impurities are driven off. The calcium acetate is then distilled with hydrochloric acid, the result being the formation of calcium hydrochlorate, which remains in the still, and the liberation of tolerably pure acetic acid, which comes over as a distillate.

For the production, however, of pure glacial acetic acid, most manufacturers adopt a somewhat different method. The calcium acetate, instead of being distilled with hydrochloric acid, is converted into sodium acetate by the action of sodium sulphate, and the former salt purified by repeated solution and crystallisation. The pure sodium acetate thus obtained is then placed in a glass, or other suitable retort, mixed with strong sulphuric acid, and subjected to distillation at a properly-regulated temperature; the result being the formation of sodium sulphate and glacial acetic acid, as is shown by the equation—

$$2C_4H_6KO_2 + H_2SO_4 = 2C_4H_4O_2 + K_2SO_4.$$

Acetic acid thus prepared should have a specific gravity of 1·0635, although in reality density is no criterion of the strength in this case. It should be solid at 45° F., but, curiously enough, when once melted it crystallises again with difficulty, remaining liquid at and below a temperature of 40°, even although well shaken. If, however, it be touched with the point of a crystal of almost any body, but especially of itself, the whole mass instantly assumes the crystalline state, and the temperature rises to 50°.

An examination of the trade list of a dealer in acetic acid now before us shows that there are at least six different strengths in the market, ranging in price from fivepence to three shillings and sixpence per pound, the glacial varities being solid at temperatures of from 34° to 60°. To these we may add the weaker variety, the well-known vinegar, which, in some cases, is simply a dilution of the stronger article, although in others it contains in addition acetic ether, sulphuric acid, and mucilage.

From the readiness with which acetic acid enters into combination and forms salts with the alkaline metals, it would seem at first sight a simple thing to ascertain the percentage of real acid that any sample might contain; but in reality it is not so, the so-called neutral acetates of those metals having an alkaline reaction, which makes it somewhat difficult to ascertain exactly the point of saturation. Various methods have been proposed of overcoming this difficulty, the best probably being that of adding to the sample to be tested a known excess of barium carbonate, filtering out the soluble acetate formed, washing and drying, and weighing the remaining carbonate. The loss of weight gives the quantity combined, from which the amount of real acid may easily be calculated.

For the ordinary purposes of the photographer, however, such exact results are not required; all that he wants is a ready means of arriving at an approximate idea of the strength of the article he buys, and this he can do very simply by the use of crystallised potassium bicarbonate. We select this salt because its combining proportion is so nearly twice that of the anhydrous acid that for all practical purposes it may be held to be so, and thereby much calculation will be saved. In this way 100 grains of the crystallised bicarbonate may be considered equal to fifty grains of real acid; and, to reduce the necessary calculation to a minimum, we should recommend our readers to dissolve the potassium salt at the rate of 100 grains in each 500 of water. With such a solution all that is necessary is to add it carefully to 100 grains of the acid, diluted with a little water till saturated, then ascertain the number of grains which has been added, and divide by ten, the result being the percentage of real acid, $C_4H_6O_3$,—sufficiently near for all practical purposes.

Tested in this way glacial acetic acid should show not less than 85 per cent.; *concentrated* acetic acid 30 per cent.; and ordinary vinegar, that known in the trade as No. 24, 5 per cent. There is a variety occasionally met with, known as "Beaufoy's acid," which is generally supposed to be similar in strength to the concentrated acetic acid; but of several samples which we have recently examined none contained more than 25·7 per cent.

The figures here given will show that, taken roundly, three parts of concentrated acetic acid, four parts of Beaufoy's, or seventeen of ordinary, vinegar may be substituted for one part of glacial acetic acid. We have something to say about impurities and how to detect them, but must reserve that for a future occasion.

BRITISH ASSOCIATION REMINISCENCES.

What struck us as a little singular in the northern capital of Ireland was that, in the midst of scenes of great pictorial beauty and general interest, there should exist such a paucity of photographic representations of these scenes offered for sale. Comparing the habits of one place of meeting of the Association with another, we have a vivid recollection of how the shops of the printsellers and stationers at Edinburgh teemed with photographic views of the numerous salient points in that land of "mountains, lakes, cakes, and brave men;" but in Belfast we did not find the same pictorial or picture-buying enthusiasm prevalent. Whatever the demand may be, the less said about the supply the better. And yet Belfast, from its central commercial position, should have numerous visitors who would be desirous of carrying away with them pictorial mementoes of Ulster; while it boasts of a wealthy population who must certainly possess more æsthetic taste than that which finds its limit in the artistic design of a linen table-cover or something which appeals directly to the development of trade in connection with the staple productions of Belfast.

The Giant's Causeway, as may well be imagined, is nearly done to death. With many of the "Northerners" this agglomeration of basaltic columns forms the alpha and omega of sights to be seen in the north of Ireland. They seem to have "Causeway on the brain." Speaking to a resident of an intention we had formed of ascending a mountain in the neighbourhood, in order to have a view of the beautiful valley in which Belfast lies, our intention met with approval; "but," said he, "you ought, above all things, to see the

Giant's Causeway." And so with everything else. A projected trip to an inland lough (pronounced like the Scottish *loch*) was, we were told, all very well, but surely the Giant's Causeway would not be overlooked. We may as well finish this ear-bedinned subject by saying that it really is a "big thing," and *should* be seen. The Causeway is distant about sixty miles from Belfast, on the extreme northern coast of the island, and is accessible by railway or steamboat. Numerous parties made up of members of the Association were formed and visited it by rail; but the most important trip was made by water, a large and influential party having been invited by the Mayor of Belfast to accompany his Worship in a new and splendid steamer specially engaged for a visit to this far-famed basaltic formation. Those who proceed by land must take train to Portrush, a favourite watering-place near the thriving town of Coleraine—itself accessible to vessels of light draught. From Portrush the Causeway is distant about four miles. The similarity of the geological strata of the Giant's Causeway and that of Staffa is easily accounted for. In the olden times Fin MacCoul, the Irish giant, invited the Scotch giant Benandonner to come over and fight him, and politely built a bridge to Staffa for him to cross over to receive his "batin'" so that in the journey he should not wet the soles of his feet. The bridge has since been washed away, but the piers still remain to attest the truth of the story. There are numerous most effective photographs of the Causeway which have been, and still are, to be taken. Of the former the best we have seen is a stereoscopic view of *Giant's Gateway and Loom and Great Causeway*, No. 932, by G. W. Wilson, of Aberdeen. Probably the most effective single view which exists of this famous sea-girt platform and the adjacent stratified cliffs is that which was engraved in the *Illustrated London News* a fortnight since. To convey a faint idea of the work which a photographer will find waiting to reward his toil we may state that for upwards of three miles of coast line he will find scenery comprised of rock, head-land, creek, and bay so rich in outline, so varied in form, and so susceptible of being easily "composed," that if provided with only half-a-dozen plates he will leave the scene of his labours with the feeling that three times that number would have been insufficient to make any approximation towards exhausting the pictorial stores to be found in the vicinity of the Giant's Causeway, with its 40,000 perfectly-formed polygonal columns.

Near the ancient town of Antrim, and on the banks of Lough Neagh, is to be found an admirable subject for the photographer. *Shane's Castle* is a ruined fortification, still a place of imposing appearance, and the ancient seat of the O'Neills. This was visited by numerous parties comprised of members of the British Association. It is capable of furnishing material for several pictures. Situated on the banks of an extensive and lovely lake, whose water was as smooth as a mirror on the occasion of our visit, the reflection of the castle, the trees which back it, and the sloping banks in its vicinity were so perfect as to render it sometimes difficult to say at what point lay the junction between land and water. A photographic tourist in Belfast would deprive himself of an undoubted pleasure were he to omit visiting Shane's Castle. The engravings and lithographs in the guide books fall far short of rendering justice to the noble pile, while as respects photographs of this ancient stronghold, we failed in discovering the existence of any such pictorial delineations. There seem to be numerous subjects of great photographic value in districts of the north of Ireland easily accessible which do not appear to have attracted the special attention of the landscape peripatetic photographer. Were we here inditing a handbook for photographic tourists we would advise them to take an early train from Belfast to Randalstown—which, by the way, is not a town, but merely a very small village, distant from the former about sixteen miles—enter the grounds there, and *walk* down to the lough, a distance of nearly two miles. The road winds through a lovely district rich in foliage, and along the banks of a river which, in some parts, is seen flowing so placidly as to reflect in a delightful manner the trees and verdure on its banks, while at other places it goes tumbling and dashing over a rocky and precipitous channel. Indeed, in the course of these two miles of river-side walk there is such a variety of scenery as would provide ample subjects for a photographer of taste to revel in for many hours. Nothing, however, but a binocular camera would do justice to this portion of the scenery.

It is different in this respect when the castle is reached. A stereoscopic equipment is inadequate to represent it properly; for it requires a large plate, and a lens of as long a focus as possible, to depict it in suitable proportion. There are some subjects which suffer by being represented on too dwarfed a scale, and of such is Shane's Castle. A wet-plate worker would not here be compelled to use his tent; for there are numerous caverns, totally dark, into which several hundred photographers might enter and prepare and develope their plates at leisure.

Another charming spot "where to go with the camera" in this portion of the emerald isle is the north bank of Carlingford Bay—once famous for its oyster beds. All the way between Newry and Warrenpoint the scenery is beautiful; but it culminates between Warrenpoint and Rosstrevor. Here are to be seen beautiful villa residences and roadside hamlets reposing on the banks of the bay, and backed by the picturesque Mourne Mountains; and, when the water is sufficiently calm to reflect the shipping, the villages, and the mountains, and the atmosphere is in such a tranquil condition as to cause a stratum of cloud to repose half-way up the mountains, the photographer has spread before him a scene to view which would far more than repay the slight amount of trouble involved in paying a visit to the "Montpelier of Ireland." But let him, above all things, avoid using a small camera, unless he take views for the purpose of enlarging; for, on account of optical reasons which we gave in a recent article, a photographic representation of a view of this character has a dwarfed and insignificant appearance, and does not convey a truthful impression of nature unless the lens by which it is portrayed be of sufficient focal length. The visitor to Rosstrevor must not omit ascending a projecting shoulder of the hill above the town to "Clough More," or *the great stone*, from whence a most extensive view is obtained.

Belfast appears to be deficient in professional photographers, who are much fewer in number than we should have expected. The work of the few which came under notice during our recent visit is good—certainly equal to that usually seen in London.

The British Association has been "catching it" pretty severely from some of the pulpits in Ireland, both Protestant and Roman Catholic; indeed, on Sunday last was read the latest pastoral of Cardinal Cullen, who begs his clergy to exhort their flocks to devote three days of this month to prayer, *inter alia*, "for the preservation of Ireland from that infidelity with which philosophy of a false name, under the mask of science, is trying to poison the Catholic people." Science has its martyrs as well as religion, and if Drs. Tyndall, Hooker, Huxley, and others manage to survive the storm they have raised about their ears it is, we imagine, because they are pulpit proof. Indeed, we find that in Belfast those phrenological organs which have to do with the polemics of religion—or, more properly, of theology—have received an abnormal degree of development. It is well known to everyone that Belfast is the head centre of the Orange and Ribbon faction fights—one of the religious wars which too frequently occur there upon a certain anniversary culminating, only two years ago, in terrible scenes of bloodshed and in the burning of houses. Sandy Row, the scene of the riots, is a tolerably long street inhabited by the operative classes, and is flanked by innumerable courts and back streets of the most humble character, the inhabitants of which, however, possess valiant hearts. A dirty, ditch-like river, as well as a railway, crosses the Row, which is in consequence spanned by "Boyne Bridge." As this bridge divides the Roman Catholic from the Protestant end it is easy to imagine that it would be the focus of the faction fights; and such is the case. Police barracks have been erected within a hundred yards or so of the bridge, and no outbreak took place during this year, otherwise the visitors to the meeting of the British Association might have been just in time to see at least its conclusion; for it will be recollected that during the week of the Association meeting at Brighton the Belfast faction riots formed the chief theme of newspaper description and comment.

At one of the *soirées* of the Association a graphoscope of a somewhat unusual kind, invented and made by a local optician, was exhibited. It consisted of a large concave mirror fixed in the end of the stand farthest from the spectator, between whom and the mirror a *carte* portrait was placed. On looking into the mirror a large image was seen at its focus. It is another illustration of the popular, although incorrect, optical axiomatic saying that what has been done with dioptrics may also be done with catoptrics. But whether a concave mirror or a convex lens be the best for enlarging a *carte* in a graphoscope it is not to our purpose here to inquire.

We direct attention to an announcement in another column relating to the next Exhibition of the London Photographic Society. It will be held in the Suffolk-street Gallery, Pall-mall, and will remain open from the 13th October to the 5th November. Intending exhibitors must send in their works not later than the 7th October. We hope that photographers will make a liberal response to the invitation of the committee.

The shortening of the days reminds us of the rapid advent of winter, which in turn suggests the approach of the time when photographic societies hold their business meetings. Several subjects occur to us upon which public opinion is, if not quite divided, at least unformed; and to aid in setting such matters somewhat at rest it would, we think, accomplish a most useful end if experimental committees were formed in each society at the commencement of the session, as was done in the South London Photographic Society in its early days. Among the subjects that might be thus handed over for crucial experiment and subsequent report are those of the comparative merits of gelatine and collodion in respect of rapidity when both are used dry; the fading of prints; the value and *rationale* of the supplementary exposure of sensitive plates to weak or coloured light; and other topics of a similar nature concerning which opinions are still divided. The benefit that would result from the appointment of committees of persons properly qualified to investigate such matters would be incalculable.

STRONG AND WEAK DEVELOPERS.

One of the reasons why photography makes such slow advancement is undoubtedly to be found in the varying results obtained when no intentional difference is made in the materials employed. As, for instance, the differing degrees of sensitiveness possessed by plates prepared in new and old baths are differences due entirely to changes unintentionally brought about, and are sufficient to show that where intentional changes have been made the observed results do not of necessity follow as a consequence of the changes in question, but may be entirely due to changes not intended by the experimentalist, the elimination of these incidental sources of error in the investigation of any given question is absolutely necessary if scientific truth is to be the result of the inquiry; but it is attended with such an amount of trouble, not to say expense, that it is very seldom one hears of any really accurate photographic experiments.

The results to which I now direct attention have, as will be seen, been obtained in circumstances permitting some amount of incidental error, the same bath solution having been employed for dipping a succession of plates. For accurate experimenting there can be no doubt that the bath-holder must be replenished with a fresh silver solution after the removal of each plate, otherwise it is impossible to say that the results obtained are due entirely to the intentional differences brought about, and are unaffected by the accumulated matter in the bath. So far as the properties of the developer are concerned it is my intention to give in the pages of this Journal an approximately accurate investigation of the matter, in which the final results will be tabulated for the more convenient reference of other experimentalists. In the meantime, the present papers must be regarded as furnishing only such results as may be obtained with careful experimenting, but without extraordinary precautions.

A saturated solution of iron protosulphate was prepared and the halves of a plate which had both been exposed for the same length of time to the same collection of objects, and in immediate succession, were developed—the one with the above saturated solution, and the other with the same solution diluted with an equal quantity of water. The result was that the end developed with the saturated iron solution had a little more density and a little more detail than that developed with the dilute. solution. The effect was, however, obtained on the thick end of the film. Another plate was accordingly prepared and its halves developed with the same solutions as before, only in this instance the saturated solution was applied to the thin end of the film. Result: certainly less density and possibly less detail on the side developed with the saturated iron. From this it may be inferred that a saturated solution of iron and a semi-saturated solution yield substantially the same results so far as density and detail are concerned.

Another plate whose halves had been exposed as heretofore was then brought out—the one side with saturated iron, and the other with saturated iron *plus* three times its bulk of water. Result: slightly more density and slightly more detail on that half of the plate developed with the saturated iron. In this instance, however, as before, the saturated iron had been applied to the thick end of the film. On re-performing the experiment, and applying the dilute iron to the thick end, the saturated iron gave slightly less density and slightly less detail. From these experiments it is to be inferred that, so far as density and detail are concerned, the result is the same whether we use a saturated solution of protosulphate or a solution diluted even to one-fourth of the saturated strength.

Proceeding still further in the same direction, another plate was exposed in the same manner as heretofore, and its halves developed respectively with a saturated iron solution and with the same solution diluted with seven times its volume of water, but this experiment yielded a decided difference. The half developed with the strong solution had "possibly more detail," but the one developed with the dilute iron had "much more density." As before, the thick end of the plate had been brought out with the strong iron. On reversing this condition of the experiment there still remained a little more detail on the side developed with the saturated iron when the picture was viewed as a positive, whilst the side brought out with the solution diluted to the seventh degree had decidedly more density. Hence we may infer that dilution of the developer from the point at which it contains twenty-five per cent. of the amount of salt required for saturation to that at which it contains only twelve and a-half per cent., causes a trifling sacrifice of detail (an amount scarcely to be sworn to) and a decided accession of intensity.

In every instance in the foregoing experiments the strong developer brought out the image with greater rapidity than the weaker ones. In fact, dilution causes retardation; and to my thinking it is more correct in principle than the addition of acids, Professor Towler's opinion to the contrary notwithstanding.

As protosulphate of iron requires about twice its weight of water to dissolve it at 60° F., it follows that where (as in the last experiment) the saturated solution was diluted with seven times its volume of water the strength of the solution is one part of iron salt to sixteen parts of water, which is twice as strong as the iron solution generally employed. Carrying the dilution to a still greater extent it soon became evident that the results obtained were of the reverse order, and that the weaker iron gave much *less* density than the strong solution; and, when carried to such an extent as to contain only one-eighth part as much iron salt as is usually employed, detail and density were alike lost by the dilution. For instance, when one half of the plate was developed with a solution containing—

Iron protosulphate	1 drachm,
Water	4 ounces,

and the other with the same solution *plus* three times its volume of water, decidedly more density resulted, whether the developer were applied to the thick end of the plate or not when the stronger solution was employed; and when one half the plate was brought out with the above solution, and the other with the same solution *plus* seven volumes of water, "enormously more detail and enormously more density" resulted from the application of the stronger solution. This anomalous result may, however, be a consequence of the small amount of iron salt actually brought into contact with the plate. If it were insufficient to bring about complete reduction manifestly both detail and density must suffer. Whether this was so or not, or whether dilution does, up to a given point, confer density of deposit and beyond it the reverse, I shall make manifest at a future time.

It will be as well that I should observe that no acid whatever was intentionally added to the iron solution in any of the foregoing experiments, that the plates were all free from the abnormal deposit "fog," that the prolongation of development followed each successive dilution until it became very tedious with the weakest solution above named, and that the colour of the deposit varied with the strength of the developer employed, becoming bluer and bluer as the strength of the solution was diminished.

D. Winstanley.

FOREIGN NOTES AND NEWS.

M. DAVANNE'S NEW VOLUME.—A POCKET CAMERA.—MOUNTING GLUES.—THE FRENCH EXHIBITION.—INTENSIFICATION BY AFTER-LIGHTING.—"GLASS WOOL."

THE photographic world is much like other worlds just now—in one aspect of it, at least. Photographers may be very busy; but they have, for that very reason, less time to talk. The parliaments of the profession are everywhere suspended; there is no comparing of notes going on; people are either busy or idle, and, in either case, have nothing to say. The deeds they do, too, are of a nature which do not usually find their way into gossip of the kind we mean to indulge in here. When a man takes to the moors in August he may be able to get his doughty deeds against the poor, harmless grouse recorded in the newspapers, so that many admiring friends may read, and the world know, how well the guns were loaded and the birds driven within reach of the "leaden hail." But the poor photographer has no such privilege; nobody thinks of asking how many negatives he has bagged as the result of his long day's labour. In short, not to make a long preface of it—"Story! Lord bless you, we have none to tell, sir," and therefore had better make haste and tell it.

In the quiet of this dead season M. Davanne, the eminent *savant*, has issued a useful little volume designed mainly for the use of his students at the School of Civil Engineering. The book is virtually a complete manual of practical instruction, and includes a succinct *résumé* of all the newer processes. The plan appears to be well adapted for student use, and too much explanation is avoided. For instance: in dealing with collodions, instead of going into long-winded stories of what this, that, and the other collodion does, M. Davanne simply dots down the formulæ in the order of their merits or in the order in which the various portions should be prepared. One formula which he gives is very complicated, and we rather doubt its utility, for no fewer than six different salts are added to it—three bromides and three iodides.

A novel kind of camera has just been brought out by M. Carette, of the Rue d'Enghien, which he calls the "scénographic camera" or "scenograph." It has the shape, and is much the size, of an ordinary stereoscope, and is composed of two frames, of which the one carries the objective, and the other the slide with the plates, and which are joined by a sort of sack, made of black or green cloth. This, of course, admits of considerable expansion, although taking up, it may be said, no room at all, and the whole thing folds up and goes into a box of a few inches square. The tripod forms, when doubled up singly, an ordinary cane. The instrument is, of course, destined for the dry process, and is an embodiment of the same idea that Messrs. Negretti and Zambra carried out in their pocket camera.

M. Lacan passes a high encomium upon some new paste for mounting photographs, which a M. Ramié has sent him. It is said to be very limpid and very adhesive, and possessed of capital keeping qualities. Some of it kept for a month, and, covered merely with a piece of paper, was quite good at the last. If amateurs could get something of this kind that would really keep, and would not cockle the mounts, it would be of very great use to them. The india-rubber pastes, and so forth, they have been obliged to put up with never worked well. We hope to be able to describe this gum at greater length so soon as we have an opportunity of examining a sample of it.

While on this subject we may mention that a Herr J. Meisch, writing in the new German *Year Book of Pharmaceutics*, gives a formula for a mounting glue which appears to possess some value. It consists in dissolving isinglass or even common glue in nitrous ether. The ether only absorbs or dissolves a certain proportion of the glue, making a solution of the consistency of syrup, which is, the writer says, of double the adhesive power possessed by glue dissolved by boiling water. If to this solution there be added a small portion of india-rubber, and the mixture allowed to stand for a day with frequent shakings, the glue will obtain a powerful adjunct in the way of increased resistance to moisture. The ingredients form a curious compound, but a solution of glue in ether may be a valuable thing, and ought to keep well, as well as to prevent warping.

The Photographic Society of France and French photographers generally have been much satisfied with their recent exhibition, and with good reason; for they had such a collection as, in recent years at anyrate, has never been got together in London—the more's the pity. The most noticeable feature, however, has been the enormous development which it has shown in the use of pigment processes of printing. There is not the least doubt that in this respect France and Germany are ahead of England. The general interest which is taken in all that relates to these carbon processes is deeper than it is here, and the efforts to reach perfection much more persistent over a wider area. Whether this be owing to the greater restrictions which are imposed in England than abroad we do not presume to say, but at all events, judged by the prominence of carbon pictures at the exhibition, the numerous original experimentors in the processes, and the vastly greater talk which the matter excites, France and, at anyrate, Austria appear much more alive to all the possibilities of this discovery than photographers at home are.

The *Photographisches Archiv* gives some notes, by Herr Klinger, on the intensification of negatives by after-lighting which are of interest. He states that he never intensifies his negatives with chemicals at all, but reaches the desired end in a purely mechanical fashion. His operation is of the simplest possible kind. When a negative is very thin he takes it and washes it first with common and then with distilled water. It is then dried upon the back with blotting-paper, and placed with the film side still wet out into the direct sunlight under another glass of a slightly yellow colour. As soon as the negative has become dry in this position it should be examined to see whether it has become sufficiently dense. If not, it is allowed to stay for some time longer until the desired blackness is reached. When it has become of a suitable density the negative is taken in and fixed. The results of this method are said to be very good, with the exception, however, of under-exposed negatives. But it is of the highest importance that both the back of the negative and the yellow glass placed in front of it should be perfectly clean.

An interesting suggestion has been made in the pages of the same paper, by Dr. Schnauss, with reference to the use to which "glass wool" might be put. The fineness to which threads of glass may be spun is almost inconceivable to those who know it only in bottles and window panes. In the latter even good glass possesses an elasticity which it is not generally credited with, and when spun into delicate gauge-like threads, which resemble silk more than any other substance, glass is capable of being bent and twisted and rolled up almost at will. It seems droll to think of hats made of glass, but that they are so is, we believe, a fact, as also that glass can be woven into lace and made into pens. What Dr. Schnauss suggests, however, is not any use of that kind, but that the "wool" made of this brittle compound should be employed for filtering purposes. One could always be sure that it would be clean, and that it would not be liable to be eaten away by corrosive substances passed through it, as filtering paper now is. How often does the photographer find a silver bath destroyed by being passed through filtering paper which has not been clean! and what a quantity of the bath is licked up by that paper in the course of a year! Cotton wool stuck in the neck of a funnel forms, as it is, a much safer and more economical filtering medium than most of the papers in the market, and how much more might a little tuft of "glass wool" do so! It would not only save the silver and ensure clean filtration, in the chemical sense, but would itself be usable again and again, and easily freed from the impurities with which it became clogged by a rinse with nitric acid and a wash out with distilled water. The experiment appears to us to be decidedly worth trying, and if the wool cannot be got handily in England it should not be difficult to import, for it is not very costly. M. Fr. Zitzmann, of Lauscha, in the Thüringian forest, appears to make it, and it is not very costly. You can buy half-an-ounce of it for three shillings, and it is so very light for its bulk that a quarter of an ounce will go a very long way. Landscape photographers who have frequently to filter their baths under the most disadvantageous circumstances might chance to find the "notion" very useful.

THE ACTION OF LIGHT ON PURE BROMIDE OF SILVER.

SINCE writing, a fortnight ago, on the theory of the latent image I have commenced a series of experiments with a view of throwing some further light, however little, upon this matter. My first experiment was upon pure bromide of silver in the moist state. It is scarcely necessary, I think, to call any particular attention to the different circumstances surrounding the sensitive salt in that state and when used in a photographic film. The experiment was made as a *basis* upon which to work, and as such was, I must say, in result hardly what I had expected.

The bromide was precipitated from solution of the nitrate with excess of bromide of potassium, and thoroughly washed in ten or a dozen changes of water—thus far in the yellow light of the operating room. It was then placed in a small stoppered bottle about half full of water, and exposed to sunshine. At first, and almost instantly, a very slight change of colour took place, which did not deepen materially until the exposure had been prolonged to, perhaps, a quarter of an hour, when it began to show a reddish-brown tint. Upon shaking the bottle this disappeared, proving it to have been merely surface change.

After standing for three days in full sunshine (such sunshine as our climate allows us to enjoy), but little further advance had been made, the surface colour deepening, and nothing more.

Up to this time the bottle had been kept closely stoppered, but upon opening it at this point a powerful odour of bromide was evolved. The water was poured away and renewed, and the exposure continued. After two days of this treatment the colour was visibly darker, but not much. Finding it impossible to produce any effect, except on the surface, by this plan the water was poured off as closely as possible, and a portion of the moist bromide spread pretty evenly round the sides of the bottle, the other portion being subjected to a continuation of the previous treatment. A single day's exposure in this manner served practically to reduce the whole of the first portion, which I will call No. 1, to the state of a dark, pinky-brown powder; while No. 2, after shaking up, was of a dirty-yellow colour. The two lots were then washed in alcohol first and afterwards in several changes of water, in order to remove, as far as possible, any disengaged bromine whether free, or in combination as hydrobromic acid. They were next treated with dilute nitric acid for about an hour, the acid poured away and carefully tested for silver, that from No. 1 showing a faint cloudiness when tested, while No. 2 gave no trace whatever.

The result was, as I said before, not as I had expected. I have always had the idea that the result of the *prolonged* action of light upon bromide or chloride of silver was to reduce them to the *metallic* state. But here, after several days' exposure to the brightest sunshine obtainable, we find, practically, an entirely negative result. Certainly, in the case of No. 1 the test showed the presence of a substance soluble in nitric acid, which might be either metallic silver, the oxide (or sub-oxide), or, perhaps, Mr. Sutton's oxybromide. The former appears to me the most likely. I cannot believe in the absorption of oxygen by silver under these circumstances, knowing how little susceptible that metal is to oxidising influences.

But surely, if Mr. Sutton's theory be correct, No. 2 should have shown, not merely a trace of soluble matter, but the *whole* of it should have been dissolved by the nitric acid. According to Mr. Sutton an exposure of a few seconds in the camera is sufficient to convert the whole thickness of the film into oxybromide of silver, which he supposes (as part of his theory) to be soluble in nitric acid, and to be of a yellow colour.

An experiment like mine, though necessarily differing from the exposure of a prepared film in the camera, agrees so far as this, that bromide of silver is present and a plentiful supply of oxygen is available. If, then, in the case of a sensitive film the oxybromide be formed *in a few seconds*, why should *days* be insufficient to produce it in the other case? As Mr. Sutton makes the solubility in nitric acid a necessary feature in his theory, I have taken the same point to prove the non-existence of oxybromide of silver.

W. B. Bolton.

PRINTING MOULDS.

I observe that Mr. W. E. Batho has been directing the attention of photographers to the probability of making moulds without the aid of the hydraulic press, and that he has suggested sulphur as being a suitable thing to make the moulds of.

I have been working in that direction for three years and have tried a great variety of things, and many with some degree of success; but the height of perfection is to be found in using ordinary fine sealing-wax for making the moulds. This melts at a low temperature and gives the finest results for any kind of subject, either in line or half-tone subjects.

Like all other things it only requires care to gain results of the best kind. I have made moulds in sealing-wax equal to any done in soft metal with the hydraulic press, and they seem capable of producing a great quantity of pictures before they show any defect. If a mould should get spoiled another may be made in a few minutes with the same sealing-wax, by simply placing the plate or shallow box on a hot plate of iron, putting the gelatine relief upon it, and applying pressure for about half a minute. An ordinary copying press will answer every purpose, providing a piece of finely-ground glass be cemented to the platen, which must be ground perfectly true.

The most important thing to be observed is not to have the box containing the sealing-wax too deep. It should not be deeper than the thickness of a six-sheet cardboard, for if deeper a sharp mould cannot be obtained. My box is made of a piece of flat sheet brass about the eighth of an inch thick, and has an edging made of a piece of printer's brass rule rivetted all round. The sealing-wax is melted in this box, and a little more used than is required for the mould. All above what is required will squeeze out at the sides and may be scraped off.

The same press will answer for printing the pictures with; or any other kind of press may be used, bnt the platen must work on a swivel, so that it can find its own level. The whole of the apparatus, even if made in the best manner, need not cost more than £4 or £5.

I do not know whether pictures of a large size can be produced in this way, but I think they may. The largest I have done yet has been 8½ × 6½ inches. Anyone trying this method will find that there is very little trouble—much less, indeed, than with sulphur; and the result is simply perfection.

S. W. G.

THE LATENT IMAGE UPON A WASHED AND ORGANIFIED FILM OF BROMIDE OF SILVER.

I am glad to see that the subject of the latent image upon a washed and organified bromide of silver film is not to be allowed to drop, for Mr. W. B. Bolton has published some interesting observations on my theory. To these I now beg leave to reply, in the hope that the shuttlecock may be kept up, and many a hearty blow from many a battledore be applied to it; for what can be of greater practical interest to photographers than a knowledge of the principles which govern their various operations—especially those which are concerned in the taking of negatives—for it is *here* that improvement in the art is most needed, as we have now arrived at that point beyond which advance seems to be impossible, unless we master the theory of what we are about.

Mr. Bolton suggests that there may be a sub-bromide of silver, having the same formula, $Ag_2 Br$, as the grey sub-bromide, but not the same colour, being white like the bromide; and that the latent image may be composed of this white sub-bromide.

We may, of course, make any assumption we please, and then see whether it fits in with the facts. This is constantly done in science; it is, in fact, the *only* way to proceed in the endeavour to explain natural phenomena. The objection to the white sub-bromide theory of the latent image is this—that unless that salt possesses properties very different from the grey sub-bromide, it would not be readily acted on by nitric acid; but we find that the latent image *is* readily effaced by nitric acid. The white sub-bromide theory seems to me, therefore, to break down by not agreeing with an observed fact. In order to make it agree the theory must become wild in the extreme.

In the next place, Mr. Bolton suggests that in the fully-exposed sky of a negative the bromide of silver is not necessarily acted on by light through its entire thickness, although the developer will reduce it through its entire thickness, as proved by subsequent treatment with nitric acid, which leaves clear glass. He imagines that if light had acted upon every particle of the bromide of silver through the entire thickness of the film the development would be instantaneous, instead of occupying, perhaps, five minutes.

For instance, let us suppose that there are a hundred atoms of silver bromide in a line, or column, through the thickness of the film. Mr. Bolton suggests that if light has acted upon a certain number of these only, say ten, that not only will these ten be reduced by the alkaline developer, but also the other ninety. According to him, the ten atoms acted on by light would be reduced instantaneously, and the other ninety by a slower process, and merely because the ten had been reduced.

As I said before, we may make any supposition we please; but what known fact in chemistry supports any such supposition as the above? Not one that I am aware of.

Can Mr. Bolton tell us why the ninety atoms, unacted on by light, that are reduced because ten that *were* acted on have been reduced, are to lie in the same straight line as those ten? Why may not the ninety atoms lie in any other direction within the film?

Possibly he may reply that the ten atoms were not adjacent atoms, such as the first, second, third tenth; but the first, tenth, twentieth hundredth, having the atoms not acted on between them, the light jumping from the first to the tenth, from the tenth to the twentieth, and so on. But why should light make these jumps? Why, having done its work upon atom No. 1 should it not next act upon atom No. 2, and so on, to the tenth?

And now with respect to the instantaneity of the development, or reduction of those atoms which *have* been acted on by light. Why should a single atom be reduced instantaneously? We know that time is an element in all natural phenomena. The velocity even of light is finite and measurable; and we know that in chemistry many operations require weeks and months to complete. But if there be no reason why a single atom of silver bromide should be reduced the instant the developer touches it, why are we bound to believe that an entire film of silver bromide that has been acted on by light should be reduced instantaneously by the developer? I venture to say that it is inconsistent with all that we know of chemistry, and especially of photographic chemistry, that such should be the case.

We must remember that the alkaline developer is one of the most powerful deoxidising agents known; so much so that, if placed in a saucer under a glass jar containing air, it will absorb all the oxygen from the air and leave the nitrogen for experimental purposes. When this liquid is poured upon an exposed film of bromide of silver it offers a large surface to the air, and rapidly acquires oxygen from that source as well as from the decomposition of the alkali which it contains, the metal in which gives up its oxygen and takes the bromine from the silver. Thus the alkaline developer, when spread upon the film, has two sources of oxygen supplied to it simultaneously, and from one of these sources the oxygen is in a free state. Thus, by the time that the surface-layer of atoms of exposed silver bromide have been reduced, the developer has become exhausted, and requires to be renewed, or strengthened with more alkali, in order to reduce the under-layers. We must remember also that by the very process of reduction of the exposed silver bromide the alkaline developer becomes more and more charged with alkaline bromide, which is a powerful restrainer upon its action. All this goes very much against Mr. Bolton's theory of the instantaneous action, and shows why minutes of time may be required, as well as many successive reinforcements of the developer with alkali, in order to complete the reduction of a bromide of silver film which has been acted on by light through its entire thickness.

I will now state my own idea as to how light acts upon the column of atoms, say a hundred, of bromide of silver which lie in a line through the thickness of the film, and how the developer subsequently acts upon them. I will assume a hundred atoms, and an exposure of three seconds, merely for the sake of illustration, and to make my meaning clear.

During the first second of the exposure the light, we will suppose, acts upon forty-six atoms in succession and is then exhausted, the waves being, perhaps, lengthened from actinic waves into waves of heat, electricity, or some other agent which is powerless upon the silver bromide. I need not say that this exhaustion of force must needs take place in conformity with the law of the conservation of *vis viva*. No force in nature can produce an effect without being itself more or less exhausted.

During the next second a fresh series of actinic waves is brought into play, which, after suffering some diminution of force in passing by the forty-six atoms of silver bromide which have been already acted on, perform their function—whatever that may be—upon the next thirty-four atoms, we will suppose, and are then exhausted, precisely as their predecessors were.

During the third and last second another fresh series of actinic waves, passing by the eighty atoms already acted on, do their work upon the remaining twenty; and the whole hundred have then received the impact of light. If the exposure were continued for another second a fourth series of actinic waves would traverse the whole film without producing any effect upon the altered bromide of silver, and some of them would pass out through the glass and begin to act upon a second film placed behind the first; whilst others would suffer internal reflection at the back of the glass plate, and produce blurring upon parts of the film which had not been fully exposed.

In addition to this, if my chemical theory be true, the light, by reducing the silver bromide to the state of oxybromide, sets free hydrobromic acid, some of which escapes into the air whilst the rest is retained by the film. This, during the time which elapses between the exposure and development, attacks the latent image and effaces it in parts which were feebly acted on, by reconverting the oxybromide in those parts into bromide of silver; and this is probably why we so often observe the details of deep shadows, which are cut against a high light, deficient near the edges of those shadows.

The alkaline developer acts in the same sort of way as the light, the first application reducing only the surface layer of exposed atoms; the second application, reinforced by more alkali, penetrating deeper into the film; and so on, until the whole film in the fully-exposed highest lights is reduced through its entire thickness to the state of metallic silver, which is subsequently found to be freely soluble in nitric acid, which removes it, and leaves clear glass.

I do not really see that any other explanation is consistent with what we know of the way in which nature commonly works. Therefore, although I thank Mr. Bolton most sincerely for his suggestions, I cannot accept them as affording a more plausible solution of our problem than that which I had given.

I will conclude with once more stating the main facts which we have to explain, and which we should never lose sight of. They are as follow:—Plain bromide of silver is reduced by a normal alkaline developer, whilst organified bromide of silver is not. But when light has acted upon organified bromide of silver it *is* reduced by the normal alkaline developer.

The theory of the latent image involves an explanation of the above facts, and must be consistent with them, or it is worthless.

THOMAS SUTTON, B.A.

A FEW MORE REMARKS ABOUT PRINTING.*

TREATMENT OF BROKEN NEGATIVES.

IN the first chapter of this book, *The Positive Bath for Albumen Paper*, I have given a variety of formulæ for both preparing and taking care of the printing baths, which I have either by my own, or by the experience of some photographic friend, proved to be very fine in their results, if carried out as recommended.

When a paper—say, for instance, the Hovey—is floated upon the silver bath, a treatment is required which at first seems peculiar. If you float this paper upon a medium-strong silver bath (forty to forty-five grains strong in summer) it will have to be floated a long time to obtain good results, and if floated upon a weak silver bath (twenty-five to thirty grains strong, also in summer) it will have to be floated a short time.

The reason of this is obvious. A strong silver bath repels the paper at first for quite a number of seconds; and if removed from the bath before the paper has taken to it, it will dry in tear-drops, and when printed it will be marbled in its looks, which is in itself a sure sign of too short silvering. If the paper, when removed from the bath, curls considerably, then that is another sign of too short silvering, and consequently paper silvered on a strong silver bath should be silvered for a longer time than what you would silver the same on a weak bath, and then the paper will have a strong solution on it and will be very brilliant, both when just removed from the printing-frame and when dried and finished; but it will be very much bronzed in the shadows. For *weak* or *flat* negatives, that paper would be just the thing; while for *medium*, *i.e.*, neither intense nor weak negatives, it would not, and for the *intense* negative it would be sadly out of place.

For medium negatives, the bath for sensitising the paper (Hovey) should be from twenty-eight to thirty-three grains strong, of silver alone, to the ounce of water during the summer; and while you float in the former case, on a bath of forty-five grains, from thirty-five to fifty seconds, you should not in this case float more than from twenty to twenty-five seconds. If you float the Hovey paper on a thirty to thirty-three-grain bath longer than twenty-five seconds the paper will print "woolly," even if silvered only five seconds more than the allotted time.

The paper is easily told, as to whether it will print woolly or not, by examining the surface of the freshly-silvered sheet as soon as it is removed from the bath; if it looks dead and sunk-in you may be assured that it will look *exactly* so when it is printed.

The experienced printer, when he removes the first sheet of paper from the bath, can tell whether he is silvering the right time or not (at least, very nearly), and then he can act accordingly with astonishing accuracy.

There are often very bad results occasioned by having the silver solution too cold. This is especially the case in the winter. Look out for it, if you wish to avoid trouble, both in the sensitising and working of the paper.

During the hot months of summer the paper should be kept in a damp box for a day or so before it is silvered, for when the albumen on the paper is in a damp state it will more readily take to the bath than when it is dry and horny. During the winter the paper should not be kept in a hot room for the same reason.

Treatment of Broken Negatives.—In many cases, a negative that has been broken can be mended, so as to be strong enough to resist all ordinary pressure of the back-board while printing, providing another glass is first laid in the frame and the negative laid on it.

Lay a piece of cotton flannel on a level bench or table where there is plenty of light, and match the broken pieces of the negative on it, face up. Examine the pieces closely with a magnifying glass, and lay them in *exactly* the position they were in before the negative was broken.

Now cut strips of plain, unsalted paper about an inch wide—no more though—and apply melted glue to one side of them, and place the same side of the paper to the borders of the negative, permitting about half-an-inch of the width to project out beyond the glass.

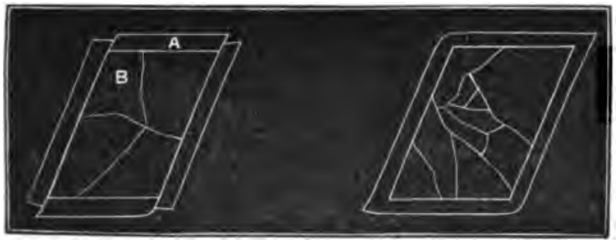
Do this to all of the sides and then turn them over the edge, *i.e.*, the thickness of the glass, on to the varnished side of the negative, and rub the paper with a tuft of cotton in close contact with the glass. The negative, as it is now, has a half-inch strip of paper glued to the four sides of the *varnished side* of it, and also a half-inch strip projecting out beyond the edges of the negative, which has glue on it, but is not as yet stuck to the *other* side (*fig.* 1). When the paper is dry, turn this negative over and apply moisture to the glue on the paper, and draw it *tightly, yet tenderly*, over the edges of the glass, and press it down smoothly on the back of the negative. Do this in turn to all of the sides, and then, when the paper is dry, you will find the pieces quite strongly held together, and you can move it about, in and out of the frame, without any danger of the pieces separating.

But, however, if these strips of paper do not hold the negative sufficiently together, as in some cases they will not, then lay the negative

* From *The Practical Printer.*

face up on a piece of plain unsalted paper, match it, and with a knife or shears cut the paper round the negative, leaving sufficient of it on all sides to allow it to turn over, not too far, on the varnished side, which, you remember, is uppermost (*fig.* 2).

FIG 1. FIG 2.



Mark with a lead-pencil on the paper, on all sides of the negative, *close* to the edge of the paper. Now remove the negative and apply glue to the side of the paper which has been marked.

Apply evenly, and lay the pieces of the negative quickly on in their proper position, before the glue has commenced to dry. Bear in mind that the *glass or back part of the negative* is laid down on the glued paper, and see also that the negative when placed together lies on the paper as it did before you removed it to glue the paper, which position is easily told by the *marked lines* on the paper.

When the pieces are matched exactly by the aid of a magnifying glass, then gently draw the paper up which projects out beyond the sides of the negative and stick them to the varnished side of the glass. This paper should not cover so much of the varnished side as to hide any part of the negative that is to come in the print when trimmed.

The negative should then be turned over, which can very well be done if you were, in the first place, to place under both paper and negative a whole glass of the same size, or a little larger if desired, as the mended negative would measure. By taking hold of this under glass and placing a couple of fingers on the broken negative, to prevent it from slipping, you can easily turn it over, and then lay it on a level stand covered with soft flannel.

Now rub with a tuft of cotton the paper which is stuck on the back of the negative, commencing at the middle and rubbing outwards, so as to secure both perfect contact and for the purpose of removing air-bubbles between the two surfaces.

Let dry, and you will have a negative that can be printed, if you wish, without another glass being placed first in the frame, and which can now be packed away as if unbroken.

This negative, having a thick white paper on the back of it, will necessarily print slowly, but if printed face up to the strongest sunlight but little difference in the time of printing will be noticed.

Medallions or plain prints can best be made from such a negative, though it may be vignetted by placing a Waymouth vignette-paper on the back of it.

The contraction while drying of the expanded paper will draw the pieces of the negative more firmly together, and thus secure greater exactness.

CUTTING THE PRINTS.

There is no part of photographic printing that is more difficult, or shows more the taste, skill, and worth of a photographic printer than this simple (?) process (as it is called by some) of "cutting the prints." Many have been the prints that have been ruined in the trimming that were otherwise good. What would be the value of a print that was brilliant and most beautifully toned if it had been ruined in cutting?

I have often been surprised that prints, which are so beautiful in other respects, should be so abominably cut out, as some have been that I have seen, when, at a glance at the prints, we could see that, with this exception, the printer thoroughly understood his business, for, even upon the closest examination of it, before it was even burnished, we could not see either weakness or coarseness of the paper in the slightest degree, too much bronzing in the shadows, lack of brilliancy, printed neither too dark nor too light, toned so finely that we cannot criticise it a particle, and, in fact, the whole print was a perfect gem, with this exception.

We will pause here a moment and consider.

Undoubtedly all of those parts of this print which show workmanship were done by a workman, an excellent one too at that, whereas the trimming, which certainly does not show workmanship, was most probably not done by a workman, but by one who was not well learned; most probably by a boy or a very careless assistant printer.

It has very often been said, and I myself have heard the expression several times, that "any one can trim prints who has been in a printing-room two days." I must here beg leave to differ, for, on the contrary, it takes years instead of days to trim them as they should be; and it is owing to the belief of many photographers in the quotation I have above cited that the almost inexperienced help is told to trim the prints (so as to keep them busy, you know!) while the foreman printer and his experienced assistants are printing, &c., with only this advice (and often not that) "to be sure and have the nose or mouth come in the centre of the print." This part of the work should be entrusted only to an experienced person with a correct eye and good judgment as to the effect required in the finished picture.

In the cutting of the prints there are a variety of rules to be observed which tend towards the prints being properly cut; and, although it is in some cases almost utterly impossible to give rules that will reach them, not knowing the style, &c., of the prints, as almost every operator poses differently, yet a very great number of cases can be hit by the rules which will be given below.

The implements, &c., that are used in cutting the prints are:—One large plate glass, 10×12 inches in size, for cutting the print upon, and in case you cannot obtain a plate glass, a thick, level, ordinary glass of the same size will answer; one whetstone; one Robinson's photograph trimmer; one pair of large shears; one shoemaker's knife; one glass, size $7\frac{3}{4} \times 9\frac{3}{4}$ inches, for cutting 8×10 prints; two 4-4 glasses, one $6\frac{1}{2} \times 8\frac{1}{2}$ inches, for ordinary 4-4 mounts, and one 6×8 inches, for prints that are to be mounted on lithographic mounts; one oval 4-4 brass mat guide, size of opening $5\frac{3}{4} \times 7\frac{3}{4}$ inches; two imperial size glasses, one $4 \times 5\frac{3}{4}$ inches, which is the size generally used, and one $4\frac{1}{2} \times 6$ inches, which is used when an imperial glass is wanted a little larger for special cases; one Victoria glass, size $2\frac{3}{4} \times 4\frac{1}{2}$ inches; two *carte-de-visite* glasses, one $2\frac{1}{4} \times 3\frac{5}{8}$ inches, which is the ordinary size, and one $2\frac{5}{8} \times 3\frac{3}{4}$ inches, which is made larger for the same reason as the Imperial. When the latter glass is used the prints should have been printed upon large card pieces, as the pieces that are obtained, as has been previously shown, are a trifle small for the last-named glass. If printers wish to obtain a great number of small card pieces from a sheet of paper they will then have to have their card-glasses shorter.

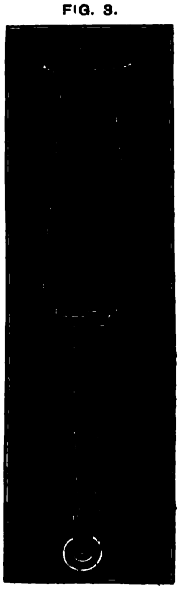
Have places for these things, and always keep them in their places, except, of course, when in use. Prints larger than 8×10 inches are very seldom cut, either before finishing or after, for they are mounted upon plain "No. 1 Extra" cardboard, size of the said cardboard varying according to the intended size of the prints, covered with either oval, square, or arch-top mats, and framed with the mats placed next to them. Although these large prints are not cut to any particular size before toning, they are trimmed and their edges cut cleanly, so that they will not be so likely to tear in the water during the future operations which they are destined to go through. In many galleries the 4-4 prints are not cut to any particular size, but trimmed as the larger prints are, and mats are also placed over them when they are about to be framed. Considerable saving can be made, as regards the expense of a mat every time a print is framed, if the prints are cut to the exact size and style before toning, as is the case in regard to the common *carte*. For instance: if you were to cut your 4-4 prints either oval or square before toning, the prints could then be mounted upon your 4-4 cardboard which was prepared for it, and, as will be shown below, you can save considerable money in the course of a year or two by so doing, of course in a greater or less degree according to the amount of business the photographer has. To do this, however, it is necessary to have mounts prepared especially for the purpose, for if the prints were mounted upon the plain cardboard, and no mat placed over them when framed, the effect would not be at all pleasing. In many galleries the prints are cut as described above, and mounted upon cardboard ornamented with gilt stripes in the oval and square forms, inside of which forms the prints are carefully mounted. Below the mounted photograph the photographer has his name printed in small gilt letters. A print cut oval and mounted upon one of the oval mounts has the appearance of having an oval mat over it, with the advantage of having your name printed on it. A great objection to this is that of having to choose the frame at the time of making your choice of picture, so that the check can be made out properly, thus enabling the operator to mark on the negative either square or oval, which means to cut the 4-4 print square or oval, according to what is marked on the said negative.

For instance: a lady wanted a 4-4 arch-top, and on choosing the frame at the time she decided on the style of print she chose a square one, and the check being made out properly (having all the particulars on it), and being passed to the operator when she entered his domain, he reserved his part of it, and sat her according to orders upon it, and marked the negative as per check: One 4-4 Arch-top, No. — (of negative). Often the words "cut square" are placed on the negative; but in this case, when the style is an arch-top, it is not necessary, because the print cannot, with taste, be cut any other way. When the print is to be mounted upon a lithographic mount the operator marks on the negative "L.M.," and then the printer also marks the same letters on the back of the print before it is toned, being sure in doing so that he marks in the shadow or drapery part of the said print, and the mounter, as she pastes the print, sees the marks, and consequently mounts such prints upon the lithographic mounts. If the lady had chosen an oval frame she would have to have a vignette style of print to look well, and the negative should then be marked (also as per check): One 4-4 Vig., No. — (of negative), cut oval. Of course prints that are printed either in medallion, square, or arch should be cut square, except in a few cases when the prints are printed plain; then they can sometimes be cut in the oval form if desired.

To those photographers who are not in the habit of this mode of working the above may appear to be very complicated, but it is so arranged in every well-regulated gallery, and where there is perfect system throughout the establishment. It is one of the most perfect ways, as regards system, connected with the orders that there is known, and it is very seldom any mistake occurs when once the plan is in good working order. It might be supposed that this would cause trouble when duplicates are wanted from the negatives, but that is not so, for when duplicates are ordered from frame photographs (*i.e.*, those photographs which are to be framed), the patrons almost invariably order the same style of frame and print that was before purchased, and the printer is thus greatly benefited, because he knows how to print every duplicate that is ordered from "old negatives," and when there should happen to be a variation in the style of frame and print, the thinking photographer will readily invent some way to prevent mistakes. The above, however, is calculated to be followed out by those photographers whose customers make their selection as to how they want everything done; but when, as in the gallery of Mr. Sarony, and also of Mr. Howell, of New York, the photographic artist chooses the style best suited for them, &c., and the printers print the order as they think best, no such way is required, and a more simple manner will answer.

When the prints are to be cut in an oval form, the excellent tool known as the Robinson photograph trimmer is indispensable. (See (*fig.* 3.) It does its work so quickly and so well that no one can estimate it too highly. It will outwear a gross of knives, and does its work better, without tearing the prints. Guides that can be used with it are furnished at a trifling cost. This trimmer, by the way, is also an excellent thing to use in cutting medallions and masks whenever you may wish to make them.

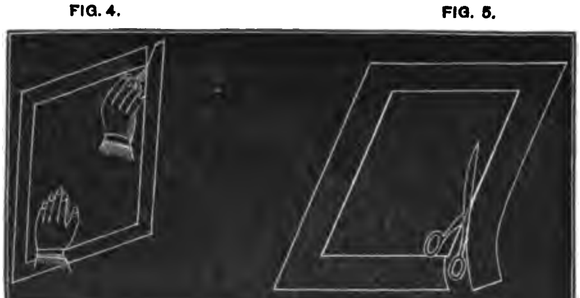
FIG. 3.



When you are about to cut square 8 × 10 prints the plate-glass is first laid down on a level bench and the print on it, and upon the print is laid the glass that is used in cutting the print. Adjust this latter glass, and with the shoeknife cut a quick and clean cut on all sides of and close to it. If you choose you can cut the other sized prints, such as the imperial and Victoria, by the aid of the shoeknife and the proper glasses. I have recommended a shoeknife because it is cheap, costing only about twenty cents; then, again, it is better handled than a penknife. When cutting with the glass and knife place two or three fingers of the left hand firmly yet lightly upon the glass, and cut with the knife in the right hand, cutting around the glass, shifting the elbows a little to one side or the other, as occasion requires. (See *fig.* 4.) The Robinson trimmer will also answer for cutting square prints with a very slight round corner. There are a great many printers who use the knife altogether in the cutting of the prints, and then again there are many who use the shears. I generally use the shears for *cartes* and imperials, but for larger prints I use the knife.

It may appear to be a small matter for me to write here how you should use your glass and shears in cutting, yet there is one thing

FIG. 4. FIG. 5.



which, if observed, will save your cutting glasses, and also save your shears from getting dull so quickly. It is this:—Many persons in using the shears cut down at the lower part of the glass at an angle, so that the blades of the shears run along the edges of the bottom part of the glass guide, and consequently the glass is very soon nicky, and in a short time some of the corners are broken off, and the glass is worthless. Now this is owing to the style of cutting (or chopping) with the shears, because every time you cut a print you also cut the glass, or try to do so. You should allow the blades of the shears to fall parallel to that side of the glass at which you may be cutting (see *fig.* 5), and you will save your glasses, and also prevent the shears from getting dull so quickly.

The rules which will, perhaps, help the beginner in cutting the prints are the following:—

1. Never have the nose or chin higher than the middle of the print, if the head is of an ordinary size, and the print is printed plain.

2. Allow a trifle more space on that side of the print toward which the head is turned, being careful not to allow too much, however, as very often the shoulders suffer by the abuse of this rule.

3. If the print is to be a *carte de visite*, and the head is very large, it ought to be cut higher up in the print than otherwise, so as to obtain plenty of the body to balance the head.

4. In cutting out a print, when the figure is leaning on a table, chair, &c., always cut in enough of the accessory to give an air or look of solidity to the base of the print.

5. Always lay your glass, when you are about to trim the prints, in the same direction as the body is, providing it is not leaning on a table, for then, of course, you must represent the idea of leaning; but when there is no such idea to be conveyed then trim as before said, so that the body will not appear to be leaning too far forward or backward, and thus give the beholder the idea of falling.

6. Sometimes by cutting the print so that the person will appear to be leaning slightly backward the effect is very good, providing the figure is that of a large Berlin head. Look out that you do not overdo this, however.

7. If the print is printed in a medallion or arch-top you should cut it so that there will be as much of the tinted border shown on one side as there is on the other, and as much at the top as there is at the bottom; and always cut prints that are printed in either of these styles in the direction that the oval or arch-top may be, and never cut them so that the cut and the oval or arch-top will lie in different directions. To do this you must be sure, in placing on the oval or arch-top for printing, that you get them to lie in the right direction.

8. If the figure is a standing one, and the whole of it can be cut in the print, then do so, and not cut in only part of it, as is very often done.

9. If it is a sitting two-thirds figure, then do not think of such a thing as having the nose or chin come in the centre of the print, as per rule 1, but have it come considerably higher up in the print, being careful, however, that you do not get it too high.

10. Sometimes there are groups of two, three, four, or even five persons in a *carte-de-visite* photograph, and in cutting out these kind of prints be sure that sufficient of the drapery on either side is cut in, as the neglect of that will make these outside persons appear very slender, being no balance to the figures; and, for such cases as these, either in the small card or the imperial, we have made the larger glasses to cut with as described above.

11. If the figure is the standing one of a lady (a bride), with a long-trail dress, and leaning on a chair, then, in cutting, not only cut the print so that you will give the idea of leaning on the chair, but cut a very great portion of the dress in, even if the figure of the lady herself is over to one side of the print, for the face is turned (or should be) towards that direction, and you can trim as above, without danger of hurting the looks of the print; on the contrary, you will greatly improve it.

12. When the background of the print is one that shows interiors or exteriors, such as the panels of doors, or a set of perpendicular rows of columns, &c., always cut the prints so that these uprights will be parallel to the sides of the trimmed print, and the cross panels parallel to the base of it. This kind of a background is more often found in the large prints, more especially so when the "Bendann backgrounds" are used.

13. In standing figures very often the place where the floor meets the background comes in sight when the print is trimmed, and in such cases you should always cut the flooring parallel to this line; and, in the great majority of cases, if the position is properly made, the figure will lean in the proper direction by the observation of this simple rule.

14. Do not, when cutting prints, try to see how quick you can cut them, but how well; for a dozen well-trimmed prints are worth more than a hundred indifferent ones. First try and see how well, and then, after you have learned that, see how quickly you can cut them.

The advice and instruction which we have endeavoured humbly to give in this chapter is intended for those persons whose experience at printing has not been so extended as ours, and it is emphatically for such persons that we have written the above, and not for learned printers.

Correspondence.

"M. LEON VIDAL'S COMPLAINT."

To the EDITORS.

GENTLEMEN,—Will you permit me to say a few words in reply to the article entitled *M. Leon Vidal's Complaint*, of which I have not the honour of knowing the author? I will be very brief, so as not to abuse your courtesy.

It is very difficult to give a sound opinion upon a subject with which one is insufficiently acquainted, and that is the position of the author of the article I allude to, so far as regards my polychromatic process. I shall confine myself, therefore, to thanking him for his well-meant observations, which I take in the best possible part, and I beg him to believe that my process, singularly perfected since the publication of my earlier *mémoires*, has become actually more practical, and easier to work, for producing fine results than the simpler process of lithochromy.

And I may inform him that I can obtain subjects (or any one could) in a facile and rapid way, and at an extremely low cost price. There is an *atelier*, set on foot by me, now in work at Marseilles, and in a few days I hope to be able to send you a collection of various samples of portraits, whose qualities, I hope, will be readily recognised by all. To these prints I shall append the scale of prices according to the numbers ordered, as that will speak more distinctly than any lengthy description of my process as to how far it has reached a practical working position; but that I refuse to publish the process down to its minutest details, for I am at this moment busy with a work that will give such description, and that with numerous polychromatic illustrations. I therefore beg my respected critic to hold his final estimate of my process in suspense until he is *more amply informed*, as our lawyers say.

As to the regrets which I have expressed relative to the silence on polychromic photography which the reporters on the exhibition of the Photographic Society of France maintained, I did not think in expressing them to give the idea that I was grieved at the treatment of my honourable *confrères*. I should be very sorry if M. Gobert or his companions were for a moment to fancy that I intended any such thing as to reproach them with neglect. It was not so; and I shall give you an exact account of the motives which induced the silence of which I spoke. Neither Paris nor England has yet appreciated the practical value of my process or the numerous applications of which it would form the starting point. My attempts are merely set down as "curious;" and it was in order to avoid resting under a depreciative adjective of that kind that I wrote my letter to M. Lacan. I had no desire to make reflections upon any one; I only wished to fill a hiatus, and it would have been painful for me to have spoken from mere personal motives. But I believed that I had sunk my own individual interests, and that I cared simply for the future of our art—yes! that I was filled with enthusiasm as I surveyed all that may be produced, all the beautiful creations of photography, when my ideas, realised in completer fashion by others than I can hope to reach, shall permit the application of polychromy and simple monochromy to the general purposes of the art—when green trees, blue sky, and water may replace, without modifying anything, whether in the form or in the detail, black trees and a murky sky, with murky water, &c.

I hope for these results by means which I have already improved, and I shall applaud, with all my heart, all progress that others make towards the goal I seek.

In conclusion: I shall leave the author of the article in question until such time as he can examine my new specimens and note their market price, or, if that suffices not, till he can read my new book and judge, by the details which it will contain, of the essentially practical value of my polychromic process. I am, meanwhile, very pleased to think that he should have deigned to occupy even a moment of his time with my modest labours, and he may rest assured that the more his criticisms are animated by such good nature the greater will be my gratitude.

You will oblige me, gentlemen, by giving a place in your next number to these few lines, for which courtesy I thank you beforehand, and beg you to accept the assurance of my sympathetic and fraternal sentiments. LEON VIDAL,

Secretary to the Photographic Society of Marseilles.

Marseilles, August 30, 1874.

[We were far from wishing to impute motives of personal pique to M. Vidal. On the contrary, we recognised in his letter the spirit of a dauntless enthusiast, and all that we did was to hint that his enthusiasm might possibly be misdirected; but it will give us very sincere pleasure to find that we were doubting without cause, and we shall be happy to give our best attention to his book and samples when they reach us, and to promptly acknowledge our error if it prove to be all our friend and able collaborateur M. Vidal says.—EDS.]

GELATINE *VERSUS* COLLODION.

To the EDITORS.

GENTLEMEN,—Would you, or some of your correspondents who have had experience in most of the dry-plate processes, kindly inform me if the results obtainable by an emulsion made with gelatine are *in every respect* equal to those obtainable with a collodion emulsion; and, if not, in what respects do they fall short. Is it in sensitiveness or perfection of result?

Not being able to procure collodion or commercial dry plates unless by post or at great inconvenience, I have been trying the gelatine process all this summer and found it most satisfactory, the average exposure, in good light, being from two to three seconds for stereoscopic plates with small single lenses of three-inch focus and three-eighths of an inch stops. Whether this is about the average for other dry plates I would be glad to learn, never having had an opportunity of trying any of them.

The emulsion I generally use contains, per ounce, fifteen grains of gelatine, twenty-five grains of silver, and eighteen grains of bromide of potassium. I never find the least inclination to blistering of the film, except when the emulsion is beginning to decompose.

Unless there be some decided advantage on the side of collodion I am surprised the gelatine emulsion or pellicle, from its simplicity and cheapness, is not universally adopted.—I am, yours, &c.,

September 8, 1874. INQUIRER.

[Gelatine emulsion, if carefully prepared, is generally admitted to give plates possessing more sensitiveness than collodion. We shall be glad to have the experience of readers who have conducted tentative experiments.—EDS.]

COMBINATION PRINTING.

To the EDITORS.

GENTLEMEN,—The following method of combination printing I have found to be quick and good:—

Take the sitter against a white background, finish the negative in the ordinary way without varnishing, dry well, and then paint with a camel's-hair pencil over the figure with a mixture of gelatine in saturated solution of gallic acid; when well dry immerse in a bath of iodine in iodide of potassium until all the silver round the figure is changed into iodide of silver; wash, and dip into the negative bath; then expose under a transparent positive; develope, and finish in the ordinary way.—I am, yours, &c., F. J. D.

September 7, 1874.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I have the honour to inform you that the forthcoming Exhibition of the Photographic Society of Great Britain, which will include the works intended to compete for Mr. Crawshay's prizes in portraiture and landscape, will be opened with a *conversazione* of the members and their friends at the Suffolk-street Gallery, Pall-mall, on Tuesday evening, 13th October, at seven o'clock.

The Exhibition will remain open until the 5th November (Thursday), from nine a.m. till dusk, daily; also on the evenings of Mondays and Saturdays, as well as the last day, from seven till ten p.m. Admission will be granted by tickets issued by the members. A fee of one shilling will be charged to all who are not provided with member's tickets. Evenings, sixpence, both to include the catalogue.

In order to afford time for properly classifying and hanging the pictures and preparing a detailed catalogue, it is requested that intending exhibitors will send in their works *not later than the 7th October* (carriage paid), accompanied by a letter of advice, addressed to the Secretary at the Gallery. This letter should contain the title and description of the pictures, and such other particulars of process, &c., as may with advantage appear in the catalogue; the prices also may be stated if the pictures are for sale.

As a matter of convenience each frame should have the artist's name and subject written on the front, and in the event of its being intended for the Crawshay competition that fact should also be announced.—I am, yours, &c., R. J. FRISWELL, *Hon. Sec.*

TAKING A PHOTOGRAPH.—He was a very pleasant spoken man that photographer. He said it was a nice day, and that we needed a little rain, and that the Hanley dog-fight was a bad thing, and that photographs were 13s. per dozen—no orders booked without the cash in advance. He wanted to know if I wanted full-length, half-length, bust, face, or what. I told him "or what," and he yanked his camera around, flung the big screen recklessly about, poked the skylight curtains this way and that with a long stick, and then he ordered me to sit down. "There—that way!" he said, as he jerked my body to the left and squinted at me. "A trifle more!" he said, giving me another jerk. Then he stepped back, and closed the right eye, and squinted again. "Shoulders up!" he said, as he gave them a twist which made the blades crack. Then he went to the left and squinted, and cried "Ha!" and went to the right and squinted, and shouted "Um!" and he came back, seized my head, and jerked it up until I saw stars. "That's better!" he said, as he walked back to the camera. But it wasn't. He came back and told me to twist the right shoulder round, hump up my back, swell out my chest, and look straight at a butterfly pinned to a cigar-box, and be as pleasant as I could. "Capital!" he cried, as he took a squint through the camera, "only——" and he rushed back, jerked my head a little higher, pulled my ears back, brushed up my hair, and said I'd better try to smile and look natural. "How the——" I began, but he waved his hand, and said I must preserve my placid demeanour. "Now sit perfectly still and don't move a hair," he whispered, as he threw a black cloth over the brass-bound end of the camera, and made a sudden dive into his little dark den. As he rattled the glass and dashed the acid about I felt a big pain in my spine, a small pain in my chest, another in my neck, and another in my ribs, but I said I'd die first, and I kept my gaze on that butterfly. "Ready now!" he cried, as he jumped up and put in the glass. My head began to boil, and the butterfly seemed to grow as large as a horse, and he whispered—"Look out—keep perfectly still!" I braced for a big effort, and he jerked down the cloth. I felt as if the fate of a nation rested on my shoulders, and I stuck to it. He turned away, and I heard him talking softly to himself. After about an hour and a-half he put up the rag, jerked out the glass, and ran into the den. He was out in a moment, and, as he held the negative up to the sun, he said—"Ah! you bobbed your head; have to try it again!"—A. D. MANN.

SPIRIT PHOTOGRAPHY.—Mr. S. C. Hall, the editor of the *Art Journal*, and a leading London spiritualist, has, in a letter to the editor of the *Medium*, signified his adhesion to the truth of spirit photography. We allow Mr. Hall to speak for himself:—"Sir,—Whether the photographs purporting to be portraits of persons who have passed from earth are frauds or not, to quote a somewhat vulgar phrase, 'not knowing, can't say;' but if the photographers are cheats they are unquestionably very clever cheats, for they have contrived to prevent detection, although narrowly and very suspiciously watched by professional photographers, who not only do not credit assertions, but broadly deny the possibility of alleged results. The testimonies are many that these spirit photographers are *not* frauds—at least, not always frauds—so that I must, however wonderful it seems, admit that men, women, and children who have been removed from earth by what is called 'death,' do actually 'sit for their portraits,' and that such portraits are recognisable, being not unfrequently portraits of persons who 'died' before photography was invented, sometimes of persons of whom no portrait of any kind exists. The why and wherefore one photographer should have the power to produce such portraits, and another—perhaps a better photographer and a better man—should have it not, is one of the mysterious 'puzzles' which, with many other 'secrets' of spiritualism, we may not even guess at, much less account for and explain. But to go at length into this matter is foreign to my purpose, and would be to burden your pages too much. I wish to state a simple fact, and I shall do so without comment. While M. Buguet was in London I sat to him. I was not only not expecting any result—I was more than suspicious. I ought not to have been so, for many persons as worthy of confidence as I hope I am had given to me testimony such as I now give to others. He produced of me three photographs; in each there was a form besides my own. There was no 'medium' present, and, as far as I could judge, nothing by which the manipulator could have been guided, or influenced, or assisted. Of course, I watched his proceedings narrowly. One of the three I could not help recognising as my father; I will tell you why. The face is so obscure that I cannot determine the likeness by the features; but the face is round, the head is bald; there are neither beard, moustache, nor whiskers. That was exactly my father's head; but there are thousands of heads to which a similar description would apply. There was one peculiarity, however, which not one in a thousand could have had; I explain it. My father, Colonel Hall, was an old officer, and he wore the *queue*, up to his 'death;' it was buried with him. That was in his time, sixty or seventy years ago, the common 'head-costume' of soldier-officers, but it has long gone out; and I question if one of your many readers has ever seen the fashionable 'pig-tail' of the beginning of the present century. Now, in the photograph to which I refer (one of which I enclose to you) this *queue* is perfectly distinct—as clear as if a brush had painted it in—white (he was a very aged man when he died, and had been an officer more than sixty years), and proceeding from the back of the head down the back of the body—standing out, indeed, and apart from the shoulders, as you will see. M. Buguet may be a cheat in spite of abundant testimony to the contrary; but his knowledge must have been, at any rate, superhuman if he (having never seen me before, and knowing nothing about me) could have known the characteristics of my venerable father's head and that he was among the last, if not the last, of the 'pig-tails.'—Yours truly, S. C. HALL.—I ought to add that on another of the three photographs the features are much more distinct; but that is a full face, and of course the *queue* is not seen.—S. C. H."

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

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

S. W. G.—Thanks.

W. B. WOODBURY.—Received. In our next.

COPYRIGHT.—You have rightly understood our meaning.

D. W.—We shall be glad to see you upon your return to town.

COLOUR.—Mr. Wall has written one work on the subject; but the series of lessons about which you inquire has never been reprinted.

J. S.—There is no remedy for the flare spot given by your lens. It arises from the curvature of the surfaces. Numerous lenses are advertised which give freedom from flare.

THOS. FORREST.—The note on the reduction of residues by the "Peripatetic Photographer" was intended for the more advanced class of readers; the articles we are to publish will be adapted for tyros.

P. A. T. M.—Spongy platinum is not employed in any photographic operation; hence your deceased friend must have used it for some other purpose, although you have found it amongst his photographic chemicals.

D. T.—The copyright of the engraving marked B having expired you are at perfect liberty to copy it. But you cannot copy that marked A without obtaining the written permission of the publisher, seeing that the copyright will not expire for twenty years to come.

T. S. H.—You could not have adopted a better method for making a bath; but there was no necessity for boiling the distilled water. If the water was pure the cause of the streakiness is to be found in the collodion. However, there will be no harm in sunning the bath for two days.

T. J. F.—Were we in your place we should have no hesitation whatever in using any of the processes referred to by you, except that preparation of the sensitive surface in which chrome-alum is required for hardening the film, this forming the principal claim in Mr. Edwards's patent.

B. GOLDING.—Select the half-plate lens in preference to any of the others; because, when taking a *carte* portrait, the length of the focus will enable you to place the sitter at such a distance as will avoid a too-violent perspective; while you can also take a large head and bust by it upon a whole plate.

T. L. B.—In our number for January 19, 1872, will be found a report of a meeting of the South London Photographic Society at which the subject of the blistering of prints was discussed. To that report and to an article by Mr. F. W. Hart in the number following the one mentioned, we refer you.

C. L. P.—The most friendly as well as the most valuable advice that we can offer to you is to pour the whole of your messes down the sink, and obtain from some respectable chemist a fresh supply of the requisite chemicals. You will thus be able to start *de novo* with fresh and pure materials, and we believe that your woes and troubles will cease.

H. W.—When the cloth is dyed with a fugitive colour, as many samples of grey are, it is indeed probable that the cyanide by which the silver stains were removed will also have discharged or modified the dye. We have, however, never had a similar experience. To confer energy upon a solution of cyanide of potassium when used for the removal of silver stains dissolve a little iodine in it.

F. T. DAUBAN.—There are numerous methods by which surface blocks for printing may be prepared, and all of them, so far as their details have been known, are to be found scattered through former volumes of this Journal. In volume 17, page 422, will be found the specification of a patented method for producing printing surface blocks which may possibly answer your purpose. Should it not, we advise you to consult a file of the Journal.

AGGIE.—The surface given by the use of ordinary negative varnish is not one that a pencil will write upon. A biting surface may be given either by roughening the varnish by friction with a little gritty powder applied to the finger, or by applying a coating of retouching varnish, which can either be purchased ready prepared, or may be made by dissolving sandarac in alcohol and adding a little castor oil. On a surface prepared in this way a blacklead pencil may be used with the greatest freedom without fear of scratching, and every touch will tell upon the negative. We advise you to purchase the varnish rather than attempt its preparation.

"HALF MOON."—This correspondent writes as follows:—"I have been plagued all the summer with the head of a comet or half moon, as may be seen in the picture herewith. It always occurs on the plate near the bottom as it stands in the bath, and always points upwards. It matters not which end of the plate is immersed first, the result being the same. The mark is always to be found about a quarter of an inch to the right or left of a line drawn the length of the middle of the plate, and, as before stated, near the bottom. In whole-sized plates it appears in the same locality but higher up in proportion to the size of the plate. Before or after immersion nothing is seen of it. In wet plates it appears after development; in dry plates before exposure. By reversing the plate in the slide the mark can be produced in the locality of the head. After coating the plate I pass it steadily down, then raise it and give it a circular motion about seven times. I then leave it, arrange my sitter, return, repeat the circular motion about four times, drain, and expose. I should be grateful if your could clear up this matter."——In reply: marks of a somewhat similar kind have been caused by the dipper in the following way:—If the dipper be one of the ordinary fluted glass kind, the lower end of which is turned up, it frequently happens that, by the act of immersing it, a bubble of air is carried down with it into the silver solution, which bubble becomes attached for a brief period to the surface of the plate, until it is liberated and removed by the motion imparted to the plate. That a bubble of air will, if resting only for a second upon a collodion surface, cause a mark, is apparent when you reflect that a horizontal mark will be produced on the picture by the mere act of stopping for an instant while the plate is being immersed in the solution. To the dipper, therefore, is due, we believe, the marking in question; and by using either a skeletonised silver wire dipper, or one of glass having the foot-piece cemented on, the annoyance complained of will disappear.

RECEIVED.—J. W. Morgenier's *Book of Instructions in Retouching Negative and Positive Photographs*. This is a handbook issued in connection with a matt varnish "invented and patented" by the author, who is a photographic artist in Sheboygan, Wisconsin, U.S.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 750. Vol. XXI.—SEPTEMBER 18, 1874.

NEW METHOD OF VIGNETTING.

In another column we give a very short article on *Permanent Vignettes*, by Mr. Werge, in which that gentleman describes a method adopted by him for masking a negative in such a manner as to print vignettes without any trouble, and with that degree of uniformity certain to be obtained when the vignette mask forms an integral portion of the negative itself. The method in question is of a similar character to that suggested by Mr. Woodbury some time ago, and consists in coating the negative with the sensitive solution already so frequently described in connection both with enamelling and with the reproduction of negatives by the graphite process, and so regulating the subsequent exposure under a mask that the black-lead shall be deposited to such an extent and in such gradation as to ensure the proper printing of vignettes.

Vignetting is one of the weak points of photographers. Many vile photographic productions in our possession by artists of name and fame have been rendered so merely on account of the manner in which the vignetting has been effected. A face which, as respects lighting and modelling, could not be surpassed, is entirely ruined by the way in which it has been printed, an abruptness of transition from the picture to the white background being the mode now painfully prevalent; the printer apparently believes he has done his duty if he has placed in its proper position in the printing-frame one of the ordinary vignetting glasses of commerce.

A far better effect can be obtained by the use of a sheet of brown or opaque paper with an aperture cut in it than by one of the vignetting-glasses to which allusion has been made; for a printer of only mediocre taste will rest content with placing one of the latter in contact with the negative, and trusting to such gradation from clearness to opacity as its maker has thought fit or been able to bestow upon it, while with a simple mask of the former description he must obtain the requisite gradation, either by having it fixed at a sufficient distance in front of the negative, or by arranging so as to have it kept in motion, in this way preventing abruptness of outline.

Let us here recapitulate what we said when writing upon this subject nearly five years since. It was to the effect that, as vignetting-glasses generally, if not invariably, produce hard outlines, one of two remedies should be adopted, viz., either softening still further the vignetting edge of the orange glass by one or two pieces of thin paper with apertures still smaller than the clear portion of the glass, or placing the glass at a greater distance from the negative and diffusing the light still more by covering it with a piece of ground glass or tissue paper. But it should never be overlooked that, for obtaining vignettes of the highest class, the vignetting mask ought to be prepared specially for each negative.

The convenience of having the vignetting arrangement inseparably connected with the negative is unquestionably very great. Looking, however, at the new method referred to by Mr. Werge with the greatest fairness, we do not consider it to be as good as one advocated by us on a previous occasion, as meeting in the most perfect manner the requirements of perfect vignetting. Before making a comparison between the two methods we will briefly describe our own.

A pan of moist burnt sienna is obtained from any dealer in water colours. If a *cake* be employed instead of a pan, a little glycerine must be added to the water in which it is rubbed down, in order to check its tendency of drying too rapidly. Smear or apply this over the whole of the negative, leaving the face intact. It must be applied on the *back*, or plain glass side, of the negative. Now breathe on the pigment so as to soften it, and with the point of a finger of the right hand remove, by dabbing, a portion of the pigment from about the head and shoulders, dabbing it in such a manner as to cause the clear glass to become blended into the opacity of the pigmented portion by an insensible gradation. The chances are that the pigment will become dry several times during this operation, but the ill effects of this are obviated by breathing upon it. When, upon trial, a perfect vignette has been obtained, the negative is handed to the printer, the principal resting assured that the least experienced of his staff will produce prints quite equal to the proof. Should the negative be one likely to be employed exclusively for vignettes, it will be desirable that the pigment should receive a coating of varnish to ensure its protection; but if only a few dozen prints of this class be required the varnish may be dispensed with. At any moment the vignetting mask may be removed by the application of a moist sponge and the negative left in its original condition, suited either for being used in the production of a full-bust portrait, or for having formed upon it another vignetting mask of a different character.

This method will, we think, be found to possess several advantages over that proposed by Mr. Werge, not the least of these being the ease with which any effect can be seen as it is being produced upon the negative, with a similar facility of altering the effect should it be found unsatisfactory.

FUMING PAPER.

Professional photographers—or, at least, a very large number of those entitled to that designation—are at once the most conservative and most liberal of men. Their strong conservative tendency is abundantly shown in the difficulty found in getting them to try and adopt anything that their more experimentally-inclined brethren may discover and publish for the benefit of all concerned.

An examination of our own or the pages of other journals devoted to photographic literature for, say, twelve months will show that hardly a week passes in which some useful suggestion, valuable modification of an old process, or even a process altogether new is not given. But the number of those who take advantage of the information thus given is sadly limited. We suppose that professional photographers generally are too busy to do much in the way of experiment; and, although we know that they look forward with pleasure to getting their weekly journal, we believe that in many cases it is just swallowed whole, with a feeling that they are thereby being kept "posted up" in all that transpires in the photographic world, and that if there be anything really worth adopting it will be discovered by some one with more leisure, who will let them hear more about it.

While, however, the professional photographer is so conservative that he will stick to the old path, in spite of whatever novelty may come under his notice in what we think is the only way in which novelties should come, he is so liberal that he will "take kindly" to almost anything persistently pressed upon his attention, especially if he be required to pay well for it. This tendency to take up only that which is perseveringly kept before the public eye is the only explanation of the fact that there are at the present time a number of really excellent methods of doing various parts of photographic work which, although tolerably well known by name at least, are not nearly so extensively adopted as they ought to be, and we think that fuming sensitised paper with ammonia is one of them.

The practice of fuming, as is well known, was introduced many years ago by Mr. H. T. Anthony, of New York. We tested it pretty freely at the time of its introduction, and have used it more or less ever since, and we know its advantages to be so great that, until very recently, we supposed it had been more generally adopted than we now have reason for believing to be the case; for, during the past few weeks, we have been conversing with more than the usual number of professional artists, and find the foregoing to be the fact. Believing, as we do, that by its use time and materials are saved and better results produced, we think it our duty to again urge its adoption on our readers; and with a view to confirm our previous experiences, and to strengthen us in urging the plea, we have, during the past week, made a series of experiments, which show very clearly three things:—First, better prints can be made from paper sensitised on a thirty-grain bath when fumed than from that on a sixty-grain bath without fuming. Second, paper that has been fumed can be printed in little more than half the time required for unfumed paper. Thirdly, there is in the prints on fumed paper a brilliancy and richness that, *cæteris paribus*, cannot be obtained without the ammonia.

Of the truth of this statement any operator may easily satisfy himself by repeating the following experiments; and we have little doubt that whoever does so will, for the future, include fuming amongst his necessary operations:—We prepared three baths—one containing sixty and two thirty grains each, but one of those of thirty grains contained in addition thirty grains of nitrate of soda. On each of those we floated four quarter sheets of a good sample of albumenised paper for periods varying from thirty seconds to three minutes, drew them across a glass rod on removal from the dish, and dried spontaneously. Each sheet was carefully marked in ten different places, as they were intended each to be cut into ten *carte*-size pieces, and two from each bath were fumed—one for ten, and the other for twenty minutes. We used half-a-dozen carefully-selected negatives both as to quality and equality, and after printing we toned in various baths, including the acetate, carbonate and tungstate of soda, and the carbonate and chloride of lime. The printing in the case of the fumed paper was, as we have already said, finished in much less time than that which had not been fumed; and, curiously enough, the weaker bath prints took less time than that of the stronger, which was just the reverse of the unfumed sample, the stronger bath printing more rapidly and giving better results than the weaker, but not better than the weak bath with the addition of soda nitrate. The same observation applies also to the operation of toning, and, what is of equal importance, the fumed paper seems to acquire greater richness of colour with less gold, as after toning fifty prints of each in separate dishes of a carefully-adjusted solution a volumetric examination showed that the dish in which the fumed prints had been toned contained ·42 grains more gold than that in which the unfumed prints had been toned.

What may be the true theoretical explanation of the action of ammonia on the sensitive paper we are not yet in a position to say, but some experiments at present in progress seem to point to something like the following:—When the paper containing silver chloride, silver nitrate, and silver albumenate is exposed to light, the reduction thereby effected sets nitric acid and chlorine free; two atoms of chlorine decompose an atom of water, which it finds in the necessary moisture, and, uniting with the hydrogen, forms two atoms of hydrochloric acid. Those acids, in the case of unfumed paper, exercise a retarding effect on subsequent reduction, which, of course, increases as that reduction goes on. In the fumed paper, however, the ammonia present will immediately combine to form the nitrate and chloride of ammonia respectively. Of course we merely throw this out as a suggestion, but hope shortly to be able to either confirm it or find a more satisfactory explanation.

Whatever, however, may be the explanation, the facts are certain and easily demonstrated; and we invite all to whom time, money, and the highest class of work are objects to give fuming a fair trial.

MEDALS AND THE FORTHCOMING PHOTOGRAPHIC EXHIBITION.

With much pleasure we perceive, from the letter of the Secretary of the London Photographic Society published in our last number, that the managing body of that Society has departed from the suicidal policy adopted last year of awarding medals for such pictures as a certain limited portion of their number considered the best. That much mischief resulted from that, happily short-lived, policy we know. Heart-burnings were engendered and unworthy motives attributed to those to whom were assigned the unenviable task of adjudicating upon the respective merits of the productions of, in some instances, rival photographers—a feeling of general dissatisfaction extending far beyond that which might naturally be experienced by disappointed candidates. We do not think we are likely to be accused of overstating the case when we assert that in the unwise medal policy adopted last year is to be found one of the most powerful among several causes which hastened the recent revolution in the Society, and incidentally removed from office some who considered themselves secure in that position for life.

We know it to be a fact that several professional photographers of the highest eminence would not exhibit their works last year, nor will they in future under similar circumstances, because they felt that influences were actively at work in consequence of which it was extremely improbable they would receive any medal. So long as the medal system prevails—more particularly when the judges are appointed by rival exhibitors—it would be folly to indulge in the hope that a large majority of the best among professional photographers would be otherwise than conspicuous by their absence. The medal system proved the ruin of the exhibitions of the late Photographic Society of Scotland, and incidentally led to its demise; a similar fate would doubtless have befallen the London Photographic Society but for the introduction of a certain measure of reform. As it is, evil, we fear, will have been done as regards the forthcoming exhibition; for, on the presumption that medals were to be given, many had determined not to prepare or send in pictures for exhibition, and the gratifying information that no invidious distinctions are this year to be made comes rather late, especially if pictures have to be taken expressly for the purpose. From September 11th (the day on which the fact of the holding of the exhibition was announced) to October 7th (the day on which all pictures must be sent in, and after which none can presumably be received), is not a long time. If pictures have yet to be taken not a day must be lost; still, we hope that intending exhibitors will be equal to the occasion, and submit such works as may render this year's collection not inferior, at least, to any preceding display.

We observe from Mr. Friswell's letter that the pictures entered for competition for certain prizes this year again offered by Mr. Crawshay are expected to have that fact notified upon the frames. This is well, and we hope that such announcement will be made compulsory in order that the public may be able at once to distinguish between competing and non-competing pictures, and to prevent newspaper critics from bestowing upon the Society's exhibition, *as such*, that torrent of hostile criticism which was so generally indulged in last year in consequence of the display of a number of abnormally-large heads with which the Society had really nothing to do, and which formed no part of *its* exhibition. As the Council has consented to allow the competing pictures to be exhibited simultaneously with their own, it becomes of importance that these pictures should be isolated to such an extent as will at least ensure that no visitor can make any mistake as to which of the two exhibitions any special picture or pictures belong.

GLYCERINE.

Of all the numerous chemical products used in photography there are none of such a variety as regards quality, or so subject to impurities deleterious to the photographer, as the substance which heads this article. A little of the chemistry and history of glycerine may not be amiss, therefore, for the benefit of those who are obliged to be their own analysts; and, trust us, it is, as a rule, much better to be your own analyst, or at least in a position to check others. That bugbear, time, is often an excuse for want of knowledge of the most superficial description, and in a little analytical chemistry is the best mode of spending any spare time the photographer may have.

Glycerine, we are told in the books on chemistry, is a clear fluid, oily to the touch, without odour, of a sweet taste, freely soluble in water, alcohol, and chloroform, but not in ether. When decomposed by heat it evolves intensely-irritating vapours. Its specific gravity is 1·250. The vapours referred to in this description are acroliene. The specific gravity here given is the density of the finest quality of glycerine found in commerce, which is a liquid having a consistency of so thick a syrup that it flows with difficulty.

Glycerine (the "*principe doux des huiles*," as the French call it) is produced from any of the fixed oils or fats that are saponifiable; in fact, the act of saponifying means the decomposition of the glyceride (oil) by the aid of some alkali, by which means the alkali tears away the fatty acid, and, combining with it, forms the "soap," whilst the glycerine is set free. Glycerine is an alcohol, and a fat bears the same relation to glycerine as ordinary alcohol does to any of the compound ethers, such as acetic. Glycerine, however, is a triatomic alcohol. Glycerine may be made directly by a process of saponification or by distillation. Although the first is the original process it is by the latter method we now procure our general supply. Nothing can be more beautiful than the perfect process at present adopted, and yet the qualities vary in price from eightpence to two shillings and sixpence per pound.

If oxide of lead ("litharge") be boiled for some considerable time with olive oil and water an oleate of lead is produced, which is generally known as lead plaster, and used for surgical purposes. The water that separates from this plaster will be found sweet, and, in fact, is a weak solution of glycerine largely contaminated with lead. For many years this impure product was the best we possessed. Another kind was obtained from the soap-makers, but it was so vile that it could not be utilised even for external uses in surgery, let alone any delicate photographic processes.

Up to this time it had been the belief of the chemist that glycerine could not be distilled. Such, in fact, is the case under the ordinary conditions of atmospheric pressure, &c., the application of heat resulting in the production of the acrid and suffocating fumes, as we have already pointed out. It is split up into acroliene. Some years ago, however, Messrs. Price and Co. made a chemical discovery. They found that if any of the saponifiable fats were heated with a stream of superheated steam the fat would distil, but at the same time as it distilled this compound ether, as we may call it, split up into its alcohol (the glycerine) and the fatty acid. It was also discovered that the glycerine might be redistilled with impunity in the presence of the vapour of water which had been heated above the boiling point of glycerine.

This fact, which to the chemical world was quite new and unexpected, resulted in the production of a glycerine which was, so far, quite distinct in its properties, and invaluable to the photographic world. Messrs. Price and Co. took out a patent, which has now, we believe, expired, and their process of distillation is carried on largely in most of the candle-making districts—large quantities of distilled glycerine being produced in Germany, but which, as a rule, is inferior to the English.

The composition of glycerine is $C_3H_8O_3$; or, rather, $\left.\begin{matrix}(C_3H_5)'''\\ H_3\end{matrix}\right\}O_3$

Like alcohol itself it is very neutral as regards its chemical reactions, particularly when diluted. It has a specific gravity of 1·242. When in this concentrated form its solvent powers are wonderfully increased; but it generally deposits the substance with which it is associated, on dilution, unchanged in composition or appearance. In fact, it seems to act merely as a neutral solvent with such substances as arsenious acid and iodine. It seems to form indefinite compounds with baryta and lime, because carbonic acid does not precipitate these oxides from their solution in glycerine. It dissolves all salts much more freely than water; and even sulphate of potassium—a very insoluble salt—is much more soluble in this menstruum. Deliquescent salts are soluble to any extent, and chloride of calcium and glycerine form an excellent bath where a temperature much higher than 212° F. is required. The alkaloids and active principals of plants are also remarkably soluble in glycerine.

It is evident, therefore, that glycerine in its photographic bearing may be considered without any marked chemical affinities, having more than ordinary solvent powers; but it also possesses a property which is invaluable to the photographer, namely, that it is not volatile and never dries. It is from this reason that it has been used for keeping modelling clay moist; also in printing to render paper permanently damp to the extent requisite for printing purposes. It never freezes, which is also a desirable point for many technical applications.

We have said that glycerine is almost chemically inert, but, in making this statement, we are speaking of chemically-pure glycerine. Now, therefore, comes the consideration of how far this substance is adulterated, and whether these adulterations affect the photographer.

It has already been mentioned that good glycerine should have a specific gravity of about 1·230 to 1·240. If it has been adulterated with water it will give a much lighter gravity and will be more liquid. The old glycerine, made of lead plaster or soaps, rarely, if ever, comes into the market. The presence of lead is, however, readily shown by blackening upon the application of sulphuretted hydrogen, and the lime from the last-mentioned glycerine may be detected by oxalate of ammonium. In applying tests the glycerine should be freely diluted previous to the addition of the reagent with distilled water.

Glycerine is frequently adulterated with sugars. Some specimens of so-called glycerine have been found to consist of nothing but a strong solution of glucose, or grape sugar; but when once aware of this adulteration nothing is easier than its detection. Glucose is best detected by boiling the suspected sample with an excess of potash and a few drops of a solution of sulphate of copper. The smallest admixture of glucose results in the reduction of the copper salt, and the production of a red oxide of copper. If the glycerine be evaporated upon a watch glass with a few drops of oil of vitriol cane sugar shows its presence by a blackening of the residue. Indeed, if any of these sugars be present they will leave a carbonous residue upon a piece of platinum foil if held over a spirit lamp. Glycerine is, of course, volatile, and should leave no residue. Pure glycerine ought to give no precipitate with nitrate of silver, nor should this mixture become discoloured to any extent on standing; if it do so it shows that there are volatile products present which reduce the silver, one of which is, probably, formic acid. Such a glycerine will be found generally to have a disagreeable smell, and is frequently met with in commerce.

On the presumption that it is impossible to eliminate the hyposulphite of soda from prints after their undergoing fixing in a solution of that salt without an amount of washing so protracted as to impair their brilliancy, Mr. Clemons, at the last meeting of the National Photographic Association at Chicago, as the result of certain experiments he had made, was enabled to announce that he had discovered a method by which the hyposulphite was removed in about eight minutes. At present we briefly describe the means recommended, leaving a consideration of the chemistry of the method till a future occasion. In a barrel of water is dissolved a bushel of alum. This quantity is stated to be sufficient to last a photographer his lifetime. After the prints are fixed they are transferred to this alum solution, which decomposes the fixing salt, liberating both sulphur and sulphurous acid, the former being seen as a powder in the solution so fine as to cause a slightly milky appearance, and the presence of the latter being proved by its unmistakable smell, which is that of burning sulphur. Sulphate of soda is also one of the products of the decomposition. This, of course, is washed away; but what of the sulphur that will impregnate the print? As it is evident that sulphur, if left in the pores of the paper or upon its surface, will rapidly cause its presence to be felt and the photograph to fade, it is obvious that some means of removing it must be found. To those who may feel desirous of trying this method of decomposing hyposulphite of soda, we may state that the free sulphur to which we have alluded as being present in the print which has been subjected to the alum treatment can be dissolved by oil of turpentine and the fatty oils, by bisulphide of carbon, hot liquor of potassa, and probably other menstrua.

PRACTICAL NOTES ON THE SAVING AND REDUCING OF RESIDUES.

CHAP. I.—ON THE SAVING OF WASTES.

THE subject of the collection and reduction of residues is at all times an important one to the photographer, especially when we consider the large quantity of silver used in the production of, and the very small amount contained in, the finished picture. It has been computed that ninety per cent. of the silver used may be recovered from the waste. This is perfectly correct. It *can* be, if the requisite amount of care and time be bestowed upon it; but the question arises—Will the time that must be given to do this pay? or, to use a popular query—"Is the game worth the candle?" My answer is adverse to this; time is money, or ought to be considered as such, and in my experience sixty-five or seventy per cent. is all that can profitably be recovered by the photographer. Of course, if the greater amount can be recovered without much trouble and at little or no cost it will materially add to the profits at the end of the year.

The author of the present article having contributed to one of the recent Almanacs of THE BRITISH JOURNAL OF PHOTOGRAPHY an articlè on the reduction of residues, the general system then described and advocated by him appears to have found so much favour that, at the request of the Editors, he gladly devotes the following chapters to the subject, giving such full details in connection with the whole subject of saving and reducing residues as would have been out of place in an annual like the ALMANAC.

I well remember, about eighteen years ago, when I was connected with a firm having several establishments in London, suggesting to one of the principals the desirability of saving the paper cuttings and the silver from the developing dish; for at that time the albumen with which the paper was prepared was salted with fifteen grains of chloride of sodium per ounce, and floated for about five minutes on a solution containing from 100 to 120 grains of nitrate of silver to the ounce. This was all the waste to be recovered then, as the prints were not washed previous to immersion in the toning and fixing bath; and the longer this bath was in use the more valuable it was considered for toning purposes. His reply was that it was not worth the trouble; "but," said he, "if the boys like to save it they may do so, and share the proceeds between them." Upon my assurance that it *would* be worth doing so they procured a large sack for the purpose, which, when full, was as much as they could manage to carry between them to the refiner. Up to that time this refiner had not had anything of the kind through his hands, and therefore doubted if the paper contained any silver. However, in answer to his inquiries as to its preparation, he was convinced that there might be, and he agreed to extract it for five shillings (he would not purchase it); and, in reply to the boys' inquiry if he thought he could recover that amount of silver from it, he said he would only charge the amount recovered if less than that, so that they should not at anyrate be out of pocket by the transaction. They were instructed to call again in a week, which they did, when the refiner handed them over a sovereign, with which they were intensely gratified, and I have an idea that the refiner also was not altogether dissatisfied with the transaction from the fact that the next number of the Journal contained an advertisement stating that Mr. ———, refiner, &c., would purchase photographers' paper cuttings and all kinds of photographic wastes and sweepings. But I am digressing, and will commence at once *ab initio* with the subject of the saving of wastes.

In the first place, let us begin with the dark room, where the waste consists of the silver contained in the exhausted developing solution and the blotting-paper upon which the plates have been drained before being placed in the slide, together with the old filters that have been used for the purification of the solution, and the bibulous paper for wiping the corners of the slides. For the latter of these a box or bag must be provided. The room should be fitted with a sink lined with gutta-percha or some non-corrosive material, over which the plate is developed. To the bottom of this sink is fitted an india-rubber tube dipping into a large earthen pitcher or other vessel. This should be provided in duplicate, so that the contents of the one may be subsiding whilst the other is filling. In this sink is placed a small lump of common salt, which will convert most of the silver in the developing solution into chloride. It is not absolutely necessary to do this, as it would, of course, be thrown down in the metallic form; but I prefer getting as much as possible of it as chloride, which will be found to assist the precipitation of the very fine particles of metallic silver contained in the developing, and especially in the intensifying, solution. When one of the vessels is full the tube from the sink is withdrawn and placed in the other. By the time this is full the contents of the other will have subsided, and the supernatant liquor may be drawn off with a syphon, the shorter leg of which must reach to within four or five inches of the bottom. By this means the layer of silver will remain undisturbed at the bottom of the vessel, which is again ready for the reception of the tube from the sink.

Another plan may be preferred by some, viz., having a deep tray or tank over which to conduct developing operations, the contents being allowed to remain in it until full, and then the upper portion to be drawn off, leaving the silver at the bottom. In this case it is best to make it a rule to do this periodically—say on Monday morning, after it has had from Saturday to subside. A very economical and convenient form of vessel for this purpose is the common household washing tray, which is, of course, water-tight; but, in order to its preservation, it should be varnished with two or three coats of shellac varnish, the first of which should be very much diluted, so that it may penetrate the wood and fill up the pores. The small ledge or partition in the corner made for holding the soap when the tray is used in the laundry will be found useful for holding old films or wet blotting-paper requiring draining before being put into the paper receptacle. Another sink should be provided for fixing, and over which to wash the plates. The fixing solution, whether hyposulphite of soda or cyanide of potassium, I do not think worth saving unless the same solution be used many times, as in the case of a dipping bath, when it may be added to the fixing solution from the printing department. In any case it should never be allowed to enter the developing sink, the contents of which are soluble in it. In my own practice I have always discarded the fixing solution, considering that silver recovered from very dilute solutions is not worth the time expended upon its recovery.

Let us now proceed to the savings in the printing department, where by far the greatest amount of silver is consumed, and where there is the greatest amount to be recovered. Here the waste consists of paper cuttings, filters, washings of prints before toning, rinsings of dishes, &c., the used-up fixing solutions, and the exhausted gold toning baths.

A bin or large sack should be provided for the reception of the cuttings, and for any paper or rag known to contain silver. The water in which the prints are washed previous to toning should be poured into one of two *large* pitchers or crocks until it is full, then a little hydrochloric acid should be added to precipitate the silver as chloride. The commercial acid, or "spirit of salt," which may be had for twopence or threepence per pound, will answer the purpose, common salt may also be used, but the acid is much to be preferred, as the chloride of silver, when in a fine state of division—as it always is when formed from weak solutions such as the washing waters—precipitates much more rapidly when acid than when neutral. While the contents of this vessel are settling the other should be used for the reception of the washings until full, by which time the first may be drawn off with a syphon as in the dark room.

With regard to the fixing solution, some writers have affirmed that it contains thirty per cent. of the silver used in printing. I cannot go so far as to say that that quantity can be recovered, yet a very considerable amount may be saved. The best plan for doing this is to provide large receptacles, again in duplicate, to contain the solution. These may, as in the former cases, be earthenware pitchers or, better still for this purpose, large glass carboys encased in wicker work. They hold about ten gallons, and may be had from any wholesale druggist for about five shillings each. The majority of photographers are supplied with their distilled water in such vessels. These vessels should be placed in the open air, and quite away from where the paper is sensitised, the object of which will soon be manifest.

Various methods of precipitating the silver from the hyposulphite of soda solution have been, from time to time, recommended. One is to add cuttings of zinc to it. This answers the purpose fairly, but not quite to my satisfaction, the process being very slow if the temperature be low; it also requires frequent stirring to bring the different portions of the fluid in contact with the zinc. It is now generally directed to add sulphide of potassium to throw down the silver as sulphide. This answers the purpose admirably if used with judgment. Not more should be added than is just sufficient to convert the whole into the sulphide, for it must be remembered that sulphide of silver is soluble in sulphide of potassium, therefore the precipitate will be, to some extent, re-dissolved. Another objection to its use is that it will not keep in solution for any length of time; nor, for that matter, will it keep long in the lump, unless very carefully sealed up in bottles. The method I have adopted for some years past is to precipitate the silver as sulphide with sulphuretted hydrogen, in the following manner:—

Having fitted a good sound cork into a wide-mouthed bottle, through this cork is thrust a glass tube carrying a piece of india-rubber tube long enough to reach to the bottom of the vessel containing the hyposulphite solution; a piece of heavy glass or metal tube should be slipped into the end of the tube to prevent its floating. In the bottle are placed a few pieces of sulphuret of iron, and upon this is poured diluted sulphuric acid—one part of acid to ten or twelve of water; the cork should now be replaced, and the india-rubber tube placed in the solution to be acted upon. The gas generated passing through the liquid converts the hyposulphite of silver into the sulphide, which sinks to the bottom. The solution should be stirred from time to time, so as to make the action complete. If carboys have been employed this can be more easily and quickly accomplished. They should not be more than three-fourths filled with the solution, and the gas being heavier than air, and slowly bubbling through the fluid, displaces the air in the upper portion of the carboy. When this is done, as may be known by the smell, the tube is withdrawn and the carboy corked, and then well shaken by violently rocking it backwards and forwards so as to bring the fluid into intimate contact with the gas, which will be absorbed. The tube should now be replaced and the operation repeated two or three times, when the whole of the silver will be precipitated. The bottle must now be rinsed out with water, which will prevent the further generating of gas, the smell of which is by no means pleasant.

The advantage of this method is that the materials used will keep any length of time, and are free from any injurious fumes. There is no fear of re-dissolving any of the sulphide. The process is very economical and very simple, taking a longer time to describe it than to put it into practice. E. W. Foxlee.

IS IT, OR IS IT NOT, ADVISABLE TO USE ACID IN THE DEVELOPER?

Before attempting to answer this question let us consider what results we desire to attain, for these, in all probability, vary with different experimentalists. I will state those I suppose the majority of photographers desire, which are negatives whose resulting prints will contain the greatest possible amount of brilliancy and delicacy—two qualities requisite alike in portraiture, landscape, and copying, and for which the negative is more responsible than for any other qualities *per se*.

It is generally allowed that a thin negative containing the proper scale of tone or thickness of deposited silver is the best for the purpose, and that the colour of the deposit has much to do with it; that a thin negative of a non-actinic colour will produce better results than a dense one of the opposite character; also, that the best class of negatives are of a red-brown, yellow, or olive colour, or a mixture of these tints, and the worst of the grey, blue, or purple kind.

The fineness of the deposited silver in a great measure regulates the colour. In a coarse deposit the atoms of silver are farther apart, and do not offer the same obstruction to the passage of actinic light as when they are finer and in closer contact. In a coarse deposit we have the effect of a thin negative, where a further quantity of silver has to be deposited by the act of intensification to fill up the interstices and obtain printing density. On the other hand, the fine deposit has sufficient printing power without this extra intensification. It follows, in my opinion, then, that any development which will produce the finest deposit, develope detail where the light has acted the least—that is, in the shadows—and requires no re-intensifying, is the best for general use; and the operation of wet-plate negative making is simplified as much as it very well can be.

Now with regard to the use of acetic acid in the developer. My opinion is founded on considerable experience and careful comparisons, and is decidedly in favour, not only of the use of acid, but acid in *very large* quantities, my developer consisting of more than a third part of Beaufoy's ordinary acetic acid and a *very small quantity* of the iron salt (about a third of the amount in general use), and the whole rendered somewhat viscous by the addition of saccharine and colloidal substances, whose action seems purely mechanical, cementing together, as it were, the film and the silver particles thereon deposited. With such a developer I rarely find occasion to intensify. There is no undue piling on of deposit and hard negatives, and the detail of the subject is fully brought out, *equally*, to say the least of it, with any other developer, and at the same time a proper amount of density is secured. Such a development is, however, *slightly* slower than with the ordinary kind—just long enough to be under thorough control—and, in my opinion, this is as it should be. I find that as soon as the image is well out the negative is of the right density, and nothing more remains to be done but to fix and wash.

Where ordinary development is used, almost always more or less intensifying is required to obtain the *best* results. The advantages to be gained by the use of acetic acid in quantity are, I think, undeniable; and experimentalists should take into consideration that the mere production of a negative full of detail is not the *only* want of the photographer, but a negative that can be *most easily made*, and produce *the best prints* when it is done. Not that I by any means despise a nice-looking negative, but only that the prints must also be nice-looking.

It has been universally acknowledged that a print from a good collodio-albumen dry plate cannot be surpassed in quality by any wet-plate work. Now any development of wet plates that will give as good results, and with the least trouble, I should say would be the best method; and this I claim for developers compounded with a large quantity of acetic acid and a minimum of iron salt.

Edward Dunmore.

PRINTING MOULDS.

Your able correspondent, Mr. W. E. Batho, has, I see, been making a variety of experiments with a view to facilitating the use of the Woodbury process by doing away with the necessity for the use of the hydraulic press, and its attendant expense. In this, I notice, he has commenced by going over ground which for the last five or six years has occupied my serious attention.

After endless experiments, dating from early in the year 1865, with sulphur alone and mixed with other ingredients, I have long since abandoned that material. Nearly every subject of a plastic consistency I *have* experimented on with more or less success. But the result of all my experiments has ended in the conclusion that the method about to be described is the best and most practical of all, excepting the use of the hydraulic press and soft metal, which possesses, after all, many advantages, not the least of which is the power given of changing a print from a worn-out, scratched negative into such an one as would have resulted from the negative in its virgin state, and this with a minute's labour with a strip of glass.

The method I allude to is so amply described in my patent, dated May 30th, 1873, that I cannot do better than quote that part referring to it, as I imagine from what Mr. Batho has written that it cannot have come under his notice. As will be seen, any ordinary rolling-press, such as is in the hands of every photographer, may be made available for obtaining the printing moulds; and the fact that the definite form is got by the pressure of the top of the printing press will convince Mr. Batho (who, I imagine, knows more of my process than your readers suppose) that this system is thoroughly practical:—

"When the gelatine relief either thus produced or by the method now in use is dried I take a sheet of thin tinfoil, and, having attached it to the edges of the relief by gum or any other adhesive substance, I lay on the back of this a stout sheet of plate paper, and pass the whole through an ordinary rolling-press; the foil is by this means impressed into all the details of the relief, but in that state it would, from its thinness and flexibility, be useless to print from. I proceed as follows:—A shallow metal box having a depth of not more than one-sixteenth of an inch is filled with one of the compositions named below, which on warming becomes soft, but hardens on cooling. Such compositions I make as follows:—Shellac and asphalte, lac and Venice turpentine, lac or resin and silica, in such proportions that on cooling they will have sufficient hardness to resist the action of printing. This shallow box, having been filled with the composition, I place on a hot plate until the heat softens it; it is then placed on the lower plate of the ordinary Woodbury printing-press and the foil and relief laid on it, the press closed, and the pressure applied by the under screw.

When the composition has hardened the tinfoil adheres to it, and I then remove the gelatine relief from the mould and print from it in the same manner as from the soft metal moulds now in use, by this means doing away with the powerful hydraulic presses now necessary to obtain the moulds in soft metal. The side of the foil next the composition I generally roughen with acid to cause it to adhere thoroughly to the composition. I also use the composition-filled boxes direct without the foil as a printing mould, and when sufficient numbers have been printed the box holding the composition is again heated, and can be used over and over again."

I enclose a few of the foil moulds not backed, one of which you might forward to your correspondent. WALTER B. WOODBURY.

P.S.—Since writing the above I have received THE BRITISH JOURNAL OF PHOTOGRAPHY for September 11th, and notice that another correspondent, "S. W. G.," has communicated with you on the same subject. By referring to his communication it will be seen that his method, as described, is exactly the same in substance as that given in the extract from my patent, with the exception of the tinfoil surface.—W. B. W.

FOREIGN NOTES AND NEWS.

M. DUCOS DU HAURON'S PROCESS.—PHOTOLITHOGRAPHY.—STAINED NEGATIVES.—INCONSIDERATE SITTERS.—PERMANGANATE OF POTASH AS AN INTENSIFIER.—HYPOSULPHITE IN MOUNTING BOARDS.

M. LEON VIDAL, in continuing his letter of remonstrance over the neglect of the authorities of the exhibition in Paris, offers some tolerably trenchant criticisms upon the fantastic heliochromic method of M. Ducos du Hauron. We say "fantastic," because, so far as can be known until further experiments have been made, it will be simply impossible to get pictures in colours by the plan proposed. M. Vidal dwells upon the difficulties of the process only upon one point, but that of itself is quite fatal. He says that it will not be possible to get a blue sky by combination negatives taken under different lights, and accordingly proposes that a sky should be furnished by printing one in. Of course that would do; but then, we take it, that requires to be done over all the range. The tint must exist in the pigment first and last, and no varying of the colours under which negatives are produced can alter the general result—that a blur, and not a transcript, will be the result of the compounding of hues which the interposition of coloured glasses will imply. In the words of M. Vidal—"The outcome will only be a fantastically-coloured image removed as far as possible from any resemblance to nature." He says this is not criticising the ingenious process of his friend; and perhaps it is not, but it is condemning it. That, however, M. Vidal is prevented from seeing, because he hopes that his process will just come in and fill up the gap. M. Ducos du Hauron is dreaming, but there is a thoroughly practical purpose animating M. Vidal which English readers and writers have hardly, perhaps, given him credit for. He wishes to bring his process to the test of commerce; it is as an industry that he looks upon it; and if it cannot be made an industry we suppose even he would admit that it was not a success. However, it is not for us to pursue this subject or to give an opinion—at least not yet; for we think a fair field should be left for M. Vidal to try his best upon, and that he should not have the "cold shoulder" given to him until he has worked his problem out.

Some correspondence has been going on in the *Moniteur* over a kindred subject to the above—the application of photography to lithographic printing. The well-known amateur, Count Ludovico de Courten, has been experimenting at Florence with some success, using the process known as Costelli's, and, stimulated by the account he gives of his progress, others have come forward to say that they also are advancing, and along independent lines. M. Riccardo Marzocchini writes to say that he has discovered such modifications of the old methods of working as help materially to improve the results. He can print on stone from photographs with rapidity, economy, and accuracy as great as can be done from drawings or wooden blocks. The samples he gives in support of his assertions are very good cuts; but he does not tell us how they are done, and, until he does so, we think it is wise to doubt whether the pictures can be the work of pure lithographic printing in any sense. The porous, grainy surface of the soap stone used is not in any way calculated to reproduce photographic images in perfection, and when it has been coated and cooked into something else it is a misnomer to call it lithography.

Herr Schwier published recently in the German papers a method of cleaning negatives, which is, we think, similar to one published in our columns some years ago. A well-known trouble to photographers is the staining of negatives through the varnish when they are much used. No matter how hard the varnish may be, printing in the sun, or even use in the shade, will produce discolouration, and sometimes destroy the printing qualities of the negative altogether. The appearance which negatives present that are diseased in this way is often very singular. When the discolouration radiates from a small spot—such as a touched-out hole or a scratch made by a little bit of sand in the varnish—it is tolerably easy to comprehend the cause; but when, as they sometimes do, they present an appearance as if discolouring matter had been splashed over them, producing radiations of reddish-brown marks, it is difficult to say what the cause can be. Bad washing is not always the cause, it is clear; for we remember that years ago Mr. Wilson, of Aberdeen, complained of the staining of his plates in this way in his interesting papers, *A Voice From the Hills*, and he said it occurred with plates which had been washed to perfection in the waters of a Scotch loch. But, whatever the cause, it is certain that there is no remedy for the mischief except de-varnishing and cleaning with cyanide; and this is the plan which M. Schwier recommends. We think, however, that he carries the cleaning off of the varnish a little too far. In our experience it has never been necessary to strip it entirely off the film, and where so removed any application of cyanide would make the collodion so tender that it would be apt to fly off the glass in drying. The better plan is to soften rather than remove the varnish by steeping the plate in alcohol for a little, and then to rub it subsequently with a tuft of fine cotton wool filled with a tolerably strong solution of cyanide. This will speedily take out all the stains, and if the plate be then washed thoroughly, dried, and re-varnished it will print almost as well as ever, saving only a certain bluntness.

A recent number of the little publication called *Photographisches Notizen*, issued by A. Moll, contains a rather humorous paper on the sad disproportions that exist in the estimation and rewards which fall to the lot of the poor photographer for his labours. Few are the joys of the photographer, says the writer—his one aim but to get money. Gushing scribes are fond of depicting the joy of a family when a highly-successful portrait of one of its number has been taken, and dwell on the grateful acknowledgments that are heaped upon the artist. Bah! such stupid talk is only food for laughter; and cannot one laugh if one be not vain over his work? How often, the writer proceeds, has he expended all his strength, his patience, and his artistic skill over a picture in vain! Some elegant *demoiselle* has been his sitter; he has posed her to the utmost effect, taking Rembrandt and Adam-Salomon for his guides, and resting not until a sharp negative, full of delicate half-tones and shadows, was produced—"a negative that my chief operator (even myself to wit) was proud of, and that my head retoucher (that also am I, and I have no second) went into raptures over as a perfect thing." A beautiful print was forthwith produced, and presented with enthusiasm to her grace—with what result? "She flung my picture at my feet. I, alas! unlucky mortal, had not known that the *fraulein*, when she sat to me, had got considerably 'cat's-eyed' ['crow's-footed,' we suppose] through being up all night at a ball." Well may the poor artist pause and ask how he is to know whether people who come to him are looking their worst or not. To recognise beauty is one thing, but to know when that of an entire stranger is at its best is another. If a person has just recovered from a severe attack of toothache how is the photographer to know?—how can he prevent disappointment? People should have more tender mercy in visiting on his poor head shortcomings that are all their own. Yet the luck sometimes runs the other way. This shrewd observer of men and events says that he has sometimes been baffled in getting any kind of picture to his mind. He had an ungainly subject which would not pose or could not keep steady; or the light was bad, or the devil had spat in the silver bath or the collodion—nothing was to be got but a picture so wretched that a print from it was only shown as an excuse for getting another sitting. But the thing produced raptures, nevertheless; it was the finest ever taken, and the sitter would recommend him to friends for taking a picture that he himself thought simply wretched. It is all luck or chance or whim. And the groups! But we cannot pursue the subject further. Every photographer can fill in the picture from his own experience, and when all is summed up, echo the words of the humorous German with a sigh —"so it often happens to us poor portrait photographers!"

The difficulty of getting high density in the case of reproductions is often very great, and a handy means of obtaining it is much wanted. Bichloride of mercury does not act very well because of its tendency to blacken in the sun; but the ordinary silver and iron is still worse, for it is often a work of time to get any degree of intensity with it, and the long application of these solutions to the film is apt to weaken it and make it crack and peel off. Moreover, the resulting image is rougher; the sharp lines of an engraving are often obliterated almost in silver intensification, and what is wanted is a solution that will give a dense black and white almost at once without making any heavy deposit. There are many ways of effecting this—by iodine, by uranium, and soforth. Dr. Vogel has, however, some objection to them all, and pronounces, in a recent number of his journal, in favour of intensification with permanganate of potash. It is a substance that every photographer ought to have, and acts excellently as an intensifier. The negative is developed fully in the ordinary way and fixed. A solution of permanganate of potash of the strength of 1 to 200 is then either poured over the negative or the latter is plunged into it. The negative speedily colours a yellowish-brown through the formation of super-oxide of manganese, and by further treatment with a solution double the strength here given an intensity may be reached which sulphide-strengthened negatives cannot surpass.

The same writer has recently been making some investigations into the condition of photographic mounts, with a view to find in what proportion they were tainted by the presence of hyposulphite of soda. The experiments arose out of the frequent applications which had been made to him to determine the causes of the yellow spots which many photographs exhibit. We need not give the details; but the result is interesting, for he undoubtedly found soda in the cards, and, although only in minute quantities, he demonstrated that there was often sufficient to change more than an eighth of the entire silver contained in the image. It need hardly be said that a very minute quantity would suffice to do so, and that, therefore, the utmost care should be taken to use only cards which are pure and hands which are clean in touching them. The cleanness of the cards may be easily tested by a fresh solution of iodine in alcohol-diluted water, in the proportion of 900 parts of water to two and a-half parts of a solution of fifteen grains of iodine in an ounce of alcohol. This, applied to water in which a bit of cardboard has been soaked for twelve or twenty-four hours, will discolour it if hyposulphite of soda be present. A small test tube, carefully cleaned, should be used for the experiment, which is a delicate one.

PERMANENT VIGNETTES.

SINCE writing to you about producing pictorial effects on the negative by the graphite process I have, by the same process, made permanent vignettes on the negative, and find the method answers admirably.

A vignette of any form and amount of gradation can readily be obtained, and the advantages of having it on the negative are these:—All the prints are alike, time in printing saved, and when duplicate orders come in there is no bother or consideration as to the size and form of the last, for there they are on the negative. To save the labour of blacking the whole of the outer part of the negative, blacken the inner part and put a mask over the outer part.

I consider this method both useful and valuable, and hope you will publish it, to prevent anyone rushing to the patent office with undue haste.

In conclusion: allow me to ask a question, which I will leave to all your numerous readers to answer. The question is this:—Where would all *petit patentees* have been if the foundation of their success had been patented? J. WERGE.

RAMBLING REMARKS.

IN our Philadelphia contemporary Mr. John L. Gihon contributes some interesting observations under this head.

I WELL remember that when a child, playing with others of the same age near our school, our party was one day surprised by the somewhat sudden appearance in our midst of an oddly-appareled elderly woman. We instinctively knew her to be a "gipsy," and would have shrunk away had not the gentleness of her voice and evident harmlessness of intention dissipated our fears. Although she had a kind word for each she singled me out, and drawing me towards her bade me give her my hand.

Then, in true dramatic style, she scanned the many lines that are curiously enough engraven upon its palm, and she told me that my life would be full of fortunes and of misadventures. She traced crossing upon crossing, giving to each some peculiar name, and, finally, when with a pitying look she passed me aside with a blessing, she again told me that my career would be as varied as the map which she had been studying. She may have been no prophetess; but thus far events certainly justify me in giving her the credit of having been a remarkably good guesser. I merely mention the incident from the fact that my photographic experience has been equally as singular as has been that of my social existence. If there be a purely exceptional task to undertake at all attainable by photography it seems my lot to fall into it, and the consequence is that in the prosecution of the art I have found myself in some very queer places, attended by all sorts of circumstances. Even here the fatality attends me, and I might stretch out many a chapter of more than passing interest.

A commission the fulfilment of which I undertook the other day nearly terminated on my part in a *coup de soleil;* for, although I am now writing in January, the sun in these latitudes pours down his warmest rays, and as the adventure was of a marinal character a good deal of sailing was necessary to reach and to return from the object of interest. The latter was a vessel that had lately been towed into port by one of the large steamers trading here. When found drifting with the current along the coast her interior was a mass of smouldering fire, but her hull, being of metal, merely glowed as only red-hot iron can. Speculation was rife as to what had become of the officers and crew, until they made their appearance in the city after having trudged through many a weary league of sand. They told of the fire which suddenly burst upon them, of their well-grounded fears of the explosion which they knew must follow (powder being aboard), of their abandonment of the vessel, of their precarious search for land, and of their after-hardships. They were surprised to find that the remnants of their once beautiful craft had arrived in advance, and now began a disputation as to who they should revert to. Again: the underwriters in London had to be satisfied as to the condition of the wreck. A rational man suggested that as to the latter a photograph of the interior would be the best report that could possibly be devised. Thus my connection with the affair commenced.

I have worked under difficulties many a time, but have never yet encountered greater ones than this offered. The captain must have been a practical joker; for he assured me that I would suffer no inconvenience, that there was plenty of fresh water on board, and several state-rooms sufficiently dark for manipulation. As he professed to have been an amateur photographer I had confidence in his statements, and, to my after disgust, abided by them.

Starting off in one of the little sail-boats that constantly hover about the moles we soon get upon the bosom of the harbour, and, as the wind freshens, ship just enough of the sea to completely drench all the luggage.

You know what the results would be—swelled apparatus, and chloride of silver wherever the nitrate has been. At last we reach the seared and disabled ship, and find no way of getting on board. A grapnel, however, skilfully thrown, attaches itself to the bulwarks, and gives us a chance to clamber up and over the sides, where we find no deck to stand upon. An immense shell filled with *dèbris*, with twisted beams, immense links of chain, rusted anchors, broken machinery, sections of tubular masts, knotted coils of wire rope—all this, and more similar in character, make up the scene we are to represent. Nothing daunted, ingenuity has to be taxed to get the traps on board, and to establish a place for them.

It needs no scrutiny to establish the irony of the captain's remarks concerning the rooms. There remains to us the necessity for working, and there looms upon us the fact that there is no place for the purpose. Hesitation is useless, and, as all that remains about us is of iron, we proceed to make use of it, and actually build a dark room, or rather kennel, out of great sheets, which have to be lugged from various parts of the piled-up rubbish. Of course it is not light-tight, so we strip off coats and vests, and all that decency will allow, and cover over cracks, fill up corners, and succeed in having created a stifling, nasty, dirty hole, into which we have to crawl, and out of which we return thanks for the privilege of getting. And now for the water! To be sure there is plenty around us, but it is as the old poem reminds us—"Water, water everywhere, but not a drop to drink," and, as we revise it, not a drop with which to wash. Diligent search, though, reveals the tops of iron tanks amidst the chaos, and at the bottom of them we discover sufficient if we can get it. More impromptu mechanical devices come to our aid, and we finally commence work. It would be tedious to recapitulate the obstacles that obtrude themselves at every step, but they can be imagined when I explain that we were working with 14 × 17 inch plates; that there was a heavy wind blowing; that the vessel itself had some motion; that there was no proper support for the camera, and that it would be impossible to suggest any one point that a photographer could look upon as conducive to either comfort or convenience. A successful negative ultimately crowning our efforts must be looked upon as the gaining of a genuine triumph.

In strong contrast to the above were the incidents connected with a picture-making excursion that we undertook not long since—in fact, upon that which is here known as "All Souls' Day." Then we had no reason to complain of an insufficiency of darkness where we conducted our chemical work, for we were literally "down among the dead men." For a room we improvised a niche in one of the galleries beneath the mausoleum or chapel in the midst of the Spanish cemetery. Here daylight never enters, and, although floor, walls, and ceilings alike are of white marble, we can splatter silver with impunity, and feel assured that no action of light will ever affect it. It was a strange and weird-like place in which to work; and as we groped around, assisted only by the glimmer of a candle that seemed to make the surrounding obscurity more intense, I have no doubt that we, in turn, presented a study of light and shade much more picturesque to the observer than the scene was pleasant to ourselves. We knew that all these labyrinthine galleries contained scores of dead; and as the walls repeated hollow echoes, each one different in tone, but all in imitation of the noises made by our every motion, it required no great imagination to fancy that the stark occupants about us were mocking our work. What a relief it was to rush into the open air with our plate, and linger in the sunshine over our work outside! We had been commissioned by several parties to make views of the resting-places of their departed ones, and this day was selected on account of the extraordinary and beautiful appearance the cemetery then presented.

There is an annual decoration upon this anniversary, and the entire population become visitors. From dawn until dusk a continuous swarm of human beings pass to and fro under the heavy archways and throng the grounds. The groups of people present every variety of character, every condition of life, and every phase of sentiment. There is a curious mixture of the holiday spirit, tinctured with a certain pervading disposition to sadness. From the belfry there peals out upon the air a constant and mournful tolling that at once affects the mind. Do not look up though; for if you do the illusion is at once dispelled by your observing that the ropes are pulled, and the hammers worked, by a crowd of youngsters, who are anything but reverential in performing their duties.

The place itself is beautifully situated upon the slope of a hill that extends down to the water's edge. It is divided into three distinct areas, each one of which must be intended for different grades of society. The elegance of the first one is in strong contrast to the poverty-stricken appearance of the last, where sticks and numbers planted thickly, even upon the gravel walks, indicate how crowded the ground must be with worn-out humanity. Each space is surrounded by a very high wall that appears wondrously thick. It is but a honeycomb, however; that is, it is made up of a vast number of cells or vaults, panelled in front. Every one of these cells is a depository for the dead, and the panels become suitable places for inscribing the names of the deceased. Upon these, too, are hung the decorations, the tributes of love and respect, that, when once placed here, are allowed to remain until wind and weather destroy them. For weeks previous to the day the store windows are filled with these offerings, and I can assure you that much taste and money are expended on their preparation.

Black and white beads strung on wires, fashioned into intricate patterns, twined around with ribbons, surmounted by appropriate mottoes and encircling centre-pieces—such as pictures or plaster casts of scriptural subjects—form the main part of these emblems. The cross, urn, and wreath are, of course, favourite shapes. The walls spoken of are absolutely covered with them. Occasionally a plate-glass front replaces the marble panel. Behind it you will then see these same decorations accompanied with pyramids of flowers, lighted wax candles, and occasionally a picture of the departed loved one. We finished some fine photographs and porcelains for this very purpose. The entire custom is, after all, a pretty one, and entirely commendable, proving, as it does, that those who have gone before are remembered, at the least, once a year.

(To be continued.)

PHOTOGRAPHIC ADVENTURES IN COLORADO.

THROUGH the kindness of Mr. G. W. Wilson, of Aberdeen, we have been favoured with a communication he a short time ago received from Mr. Joseph Collier, formerly the notable Inverness photographer. The love of enterprise and adventure, which was always a strong feature in the character of the latter, comes out so conspicuously in this lively epistle that we have embraced the opportunity of presenting all the narrative portion to our readers. Mr. Collier writes from Colorado, and, as will be observed, addresses himself to Mr. Wilson.

I FEEL sure the printing in carbon will be a success. I used to dream of it in the old country; but your pictures will stand enlarging when few others will. I often think of trying them in the solar camera, but have no hope of success, because of flare. I could work the solar here almost every day in the year if this were overcome. A railway company here have been trying hard to get me to take 16 × 20 plates for them, but it is of no use. It would cost me at least £100 to buy the necessary apparatus, and also a good deal of my time, and I have neither time nor money to spare.

I am sorry you abandon, at first sight, the idea of coming over for a season; the ocean passage was the most agreeable part of the whole thing to me, and I expect you would feel sorry to part with the ship before you landed. Of other matters you are the best judge, but I would like to camp out with you for three months with a keg of "eleven o.p." aboard (Scotch). I forget what I wrote to you last, and may possibly go over some of the same ground, but will tell you about some of the things I have been doing to facilitate the production of views. The great evil is to get assistance at a fair figure, and one of the stiffest things was the cutting of stereos.; so I set to work to make a machine, and, after a good deal of thinking, I struck on a plan to stamp them out. I first made a lot of masks to suit the average distance between the whole negatives; of course it does not suit them all exactly, but sufficiently near for practical purposes. I cut the pattern for them in brass, and all the rest from it, fasten this to my negative, which helps to protect it from scratching and saves the paper also, as, so long as the mask is covered, it is all right—saves gold somewhat. Now, my cutting-machine is a cast-steel die, just the size my slides are wanted, with the inside corners rounded, which answers to the rounded corner of the slide-mount when reversed, and ensures correct mounting without marking. This die is screwed on to a casting to give it grip, and the punches are attached to another cast-iron piece strongly and firmly hinged. Under this piece, which is no larger than is required, are two springs which throw up the punch whenever you take your foot off the treadle, which snaps it down. The machine is not the most perfect in the world, but I can cut with it a gross in half-an-hour, and they will be all exactly alike. Most of the slides I am sending along with this are cut with it. As I said, it does not cut perfectly, but I can make it do so. I made one on a different principle, to cut *cartes*, that works as well as I would wish. I cut them also with round corners and before toning, and then mount them out of the water. I am sorry there is no way of doing this with the slides without mixing them.

I would take a long journey to know how your prints were produced. Their tone and surface is what bothers me. I can now easily produce better prints than are produced elsewhere in the territory; but that is nothing. Some of my negatives are good, and occasionally I get a print from them to please me, but very seldom. I wish you would write down sometime the particulars of your printing, and send them to me. It will add one more to the long list of obligations I am under to you.

If you would come a season to these mountains you would forget all your illness. I have had the same trouble you speak of for at least seven years in the old country, but it left me here entirely; and although I am some fifty pounds lighter now than when I left Great Britain I have first-rate health, and so have all my family. This makes me pleased, whatever else I have to endure. Our baby, now six or seven months old, is as healthy as a baby can well be; and when I think how often the grim shadow knocked at our door in Scotland I hope I am thankful.

It is getting late, but I am half tempted to spin you a yarn about our journey north this summer. A good tumbler of toddy would help matters just now; but if you tasted American whisky once you would never forget it. Alcohol made from potatoes or Indian corn, thinned down considerably, tobacco juice of the colour of deep sherry, and you have it. Some of the wits here call it "liquid lightning, warranted to *kill* at 200 yards." So, for once, I think there is no danger of me learning to "tipple." But to my tale.

I found that I could not afford to wander about a whole summer in search of views, so I joined interest with a cousin of my own—a pure Yankee, with some means, and nothing particular to do; "a little money keeps a man here if he invests it well." He joined me for two years, and put about £200 into the business. This enabled us to get a good outfit and start. We went off the first day of July, from the foot of the mountains. Went down to Denner (about fifty miles from here) to get some things, and the news we got there was that the Utes were on the "war path," and this was confirmed by the Indian agent, whom we called on. This was rather bad news, as the disturbance was said to be just in the country we wanted to explore. However we started, trusting to the fact that a great portion of our journey lay through a country too much settled for Indian depredations, unless the whole tribe were rising. So we got our pack together, consisting of three donkeys, one mule, and two capital ponies for riding. The saddle here is very peculiar. If you remember Doré's *Don Quixote* you have it; it is girthed with breast-band and breech-band in a way that makes it part and parcel of the horse, and if you stick to it you are all right.

Our outfit I will not attempt to describe; it would weigh about 600 pounds, and contained provisions for two months, with everything likely to be required, down to a miniature tool chest and needles, darning needles, thread, worsted, buttons, and articles too numerous to mention generally. We were armed to the teeth with a heavy revolver to each saddle pommel, a large sheath-knife used for all purposes, a rifle packed somewhere handy, and a heavy whip. I might tell you of a long job, "lariotting" our animals, for they had been running wild for a year, but when handled they became quite gentle; my own would come from anywhere when called, and I never struck her yet. She was just the perfection of a beast for difficult ground, would kick and bite everything that came near her except a man, and was a beauty into the bargain. I have her yet, and will not part with her unless some one steals her. But I am getting "horsey." Well, we started along the foot-hills. The Rocky Mountains are peculiar in rising abruptly from the plains. Here we are on a level prairie, and a mile west are the mountains, two or three thousand feet high. Along the base, running north and south, are the foot-hills, composed of sandstone, limestone, and gypsum, and forming the first line of upheaval. A great deal of coal is also found there; and at every few miles a stream, or "creek," as they are called here, issues from the mountains. Every now and then you come on a herd of antelopes, a prairie-dog town, which is also the home of the rattlesnake, a small owl, or the common rabbit, all of which appear to live in harmony, and form the only variety to the traveller of the desert. My dog gets so mad at these creatures sitting on the edge of their holes so provokingly near that he will not look at them, but turns his head the other way.

Our first night we camped on the south boulder, turning our animals out to graze, fastening part of them. Next day I got some negatives of the entrance to the cañon. Next day we started north; but, how to cross this terrible mountain stream! My companion, who is somewhat foolhardy, tried it in one place, and with a worse horse would probably have gone down stream; at anyrate he would not do it again. Then we discovered a sort of tramway for taking large timber across, so I proposed to take our goods over on this, and tow our animals over with ropes. This plan succeeded; but farewell to our donkeys if the ropes had broken. Next day we reached Boulder city, at the entrance to Middle Boulder cañon, so we camped there on the side of the river. Next day was Sunday, and having some acquaintances there we lay over, and shot turtle-doves to make our dinner. Here I find that I can shoot a turtle-dove with my revolver, so conclude that I can, if necessary, hit a Yankee's hat. In the course of the day three fine specimens of young Americans, from sixteen to twenty, made up to us and insisted on accompanying us among the mountains, ordering a splendid luncheon from the hotel over to our tent, and, as they purposed having their own tent, outfit, horses, &c., &c., we made no objection, as they could part company with us whenever they pleased. Now, keep your eye on our young friends, as they will appear again, possibly, before I am done. (I hope you have a bottle near you in wading through all this.) Our new friends appeared flush of money, well educated, with no end of sporting materials—in short, "Young America out for a holiday." After taking some negatives about sunrise, we started for the mountains. We now travelled due west, through a dreary black gorge. We camped at the first place we saw any chance of getting a picture or two, and found it a very hard job. The difficulties are due to the very clear sunlight, there being no damp atmosphere to diffuse the light, and shadows as black and crisp as possible. I smoked a pipe often while exposing a plate in this place, and the result was still a patchy, ugly thing, and the sun had to be high before it struck any part of the view often, and then the shadows were perpendicular; altogether, taking some twenty-five views in this cañon tried my patience considerably. I had Mawson's extra-quick collodion and a good bath—everything was working well in the open country.

Well, young America came along; but I must not forget a good laugh I had one day. While camping near the falls, with high cliffs on every side—so high and close that no lens made would photograph them, consequently we had some difficulty in getting grass for our animals—I went up among some rocks, and with my knife in a few minutes cut as much long grass as would keep them eating for half-a-day. Well, as our animals were quietly feeding under the trees, young America, having nothing else to do, fell to tormenting one of the donkeys, which had a prime faculty for a kind of pitch-and-toss "bucking," as it is termed here. So often wearying himself, pulling its ears, tail, &c., he at last got on its back, with his face to the tail, and the tail in his hand. The donkey then commenced operations, and, in the presence of a small crowd of pleasure-hunters camped at our side, pitched young America in the air at least twenty times, fear and shame alternating in his pale countenance, while we laughed until our sides were sore. At last he, owing I expect to the donkey getting weary of the sport, got time to jump off; but he could not bear to hear of that donkey after.

(To be continued.)

A FEW MORE REMARKS ABOUT PRINTING.*

WASHING THE PRINTS.

NEXT, in order, comes the washing of the prints, although in many galleries the acidifying of them is done first.

It is a question whether it is best to place the prints first in the acid water or not, and there are many photographers who believe in washing them first; and then, again, there are many who believe to the contrary. It is not in my mind a matter of so much importance, but for several reasons I am most in favour of washing them first; and so I will commence with the washing, and then the acidifying of them will be treated of.

It was supposed by many photographers, two or thee years ago, that the washing of the prints was a matter of considerable time, and consequently they would let their prints wash half-an-hour in running water, moving them occasionally with the hands.

Within the last year or two, however, the photographic printers have found out that such long washing is not only unnecessary but injurious to the prints; and at the present day, in many of our first-class galleries, this preliminary washing is done in a few minutes.

The way we should advise our brother printer to wash his prints is as follows:—Take a half-sheet dish, although any other, if large enough, would do as well, and pour into it lukewarm water until the dish is about one-quarter full. Now place the prints in, by letting a few drop out of your left hand at a time into the dish, while, with your right, you gently and quickly push them under the water, until you have placed the whole batch of prints in the bath. Again do this as quickly as possible.

I have recommended to let a few (three or four) drop from the hand at a time in the water, because beginners are apt to get some of the prints wet (and let them stay in the hand for some time in that condition before they are placed in the water), if they were to take them from the left hand with the right one, and then place them in the water, as they might want. By being very careful, however, they can do it.

The objection to getting the prints partly wet, and then remaining in that state, even for a few seconds (say eight or ten seconds), before they are wholly submerged in the water), is, that where the water has touched them they will turn red; and if they are thus partly wet by the water, then, after you have placed them in the dish, they will show spots redder than the other parts of the prints, which will sometimes be very troublesome in the succeeding operations.

After the whole batch of prints that are to be toned are placed in this bath of warm water, move them about briskly for about five minutes, and then gently pour the water off into a barrel, leaving the prints to lay flat on the bottom of the dish. Then rinse them with a little more water, and pour this also into the barrel.

These first two waters we save, and throw down the silver in them by sprinkling a little common salt in the contents of the barrel, upon the addition of which the silver in the solution will be deposited on the bottom in the form of chloride of silver. Upon adding salt to the solution it will turn milky; whereas, before it was added the solution was of a cold, slaty colour. When this chloride of silver is thoroughly deposited then draw off the clear water by either a syphon or a faucet, as may suit the taste of the printer.

Before taking for granted that the silver in the solution is all precipitated, because you have previously sprinkled salt in the barrel, the solution should again be tested by a pinch or two of salt, and if there be no more precipitate then the silver is all precipitated, and the liquid can be drawn off without any further delay.

When you have rinsed the prints wash in one or two other changes of water, which you need not save, and then they are ready to be placed in the acidulated water, which will be treated of in the next chapter.

When the prints are in the first change of water the washing is done quickly by permitting them to come to the surface, and then gently pushing them down again to the bottom. The prints are washed more thoroughly and quickly in this way than in any other. The time required to do the above washing, after the whole batch of prints are placed in the bath, is only from five to ten minutes.

ACIDIFYING THE PRINTS.

Now, since the prints are sufficiently washed, they are ready to be placed into the acid water; but, before we do so, we will pause and consider for a few minutes the object of doing this.

It has been supposed by many printers—and in fact that is the general opinion at the present day—that the prints are placed in this bath of slightly-acid water for the simple purpose of making them red, so that they will be able to watch the toning, and also to tone them better. Now this is partly so, but it is by no means the principal object of placing them in the bath, as we will presently endeavour to show.

If our only object in placing the prints in this bath was to make them simply red, why should we not, as was formerly done, place them in a bath of salt water, and thus redden them, as it will do the work as quickly, if not quicker, than the acetic acid does, besides being very much cheaper?

The answer from some of these printers may be that they cannot obtain such nice tones as they could if the prints were "red up" with acetic acid; and, if that is so, is it not evident that there is something in the action of the acetic acid on the prints that renders them better for the toning operation than the action of the salt on them does?

The action of the salt water on the prints converts the remaining silver left in the prints after washing into the pure chloride of silver; whereas, before, part of the silver on the surface of the prints was the chloride, albuminate, and the nitrate, for it must be borne in mind "that the salt in the paper, when it is floated upon the positive bath, takes up the silver it needs, and forms chloride of silver," which is more sensitive to the light than the nitrate, "and the albumen of the paper takes up some, and forms the albuminate of silver;" and, besides this, "there is some more absorbed merely mechanically, which is properly the nitrate." Our attention was first called to the fact we have just explained upon reading, a couple of years or so ago, the action of the positive bath on the albumen paper, when floated upon it, in Dr. Vogel's *Handbook of Photography*. Thus you see that all of the silver that was on the surface in different forms is now reduced to the same form, viz., pure chloride of silver.

Now if you were to place the prints in a very diluted bath of acetic acid instead of salt, then the remaining silver in them will be perfectly converted into the acetate of silver, if they are permitted to remain in the bath long enough for the acid to overcome the other natures of the silver, and that is why I have recommended the prints to remain

* Continued from page 440.

in the acid water ten minutes for the acid to do its work well, and that is also the reason why (if the prints stick together for any length of time), even if they have once been wet all over with the acid water, the prints at those parts where they had laid close together will not be properly converted into the acetate of silver, and will not tone well, although they may not have changed colour any, *i.e.*, those parts of the prints which may be stuck together will be full as red as the rest of the prints, and thus to a careless eye may be all right, but in the toning of them, the printer will perhaps wonder what makes some of them tone so much better than others, although in the distribution of colour on the surface they seem to be all alike.

The acetate of silver is worked upon better by the toning solution than either the chloride of silver or the mixture that composed the silver on the prints before they were placed in the acid or salt water (being chloride, albuminate, and nitrate). The proof of the above can be observed by the toner as he tones the prints that have been "red up" in either the salt or acid water; and then again as he tones those which have not been "red up" at all, but simply washed.

I do not mean to give the young beginner the impression, however, that prints that have been placed in the salt water, in lieu of the acid water, will tone badly in the toning baths; for, on the contrary, they will tone very fairly, as the good old-fashioned tone (good if it is old) will show, but I do mean to say that better tones can be obtained with the use of the acid water, provided the conditions are alike. An excellent toner may take prints that have been placed in salt water and obtain better results than an indifferent toner would with prints that have been placed in acid water.

The quantity of the acetic acid required is just sufficient to properly convert the remaining silver in the prints into acetate of silver, as has been said before, and no more. I use generally about an ounce of the acid to the gallon of lukewarm water. I use lukewarm water because it will more quickly do the work required than cold water.

In Germany and England glacial acetic acid is used, but when that is used only the slightest quantity is required, as it is very much stronger than the acetic acid No. 8. This acid (glacial acetic) is not used at all, I think, in this country, and when the acetic No. 8 can be obtained it had better be used, as the glacial is very expensive, more so than it is proportionally stronger.

When you commence to make your acid bath, place the lukewarm water first in the dish you are going to use, and, after measuring out the quantity of the acid in a small vial, pour it into the water at different places, and then, with your hand, stir the water well for about one minute, so as to get the acid thoroughly mixed with the water. Now place the prints into this bath as quickly as possible, in the manner described in the preceding chapter, *i.e.*, by permitting two or three to fall at a time from the left hand, while with the right they are separated as quickly as possible.

When you have placed every print in the acid water, then keep them in constant motion for ten minutes, for the reason above mentioned (viz., that the silver in the paper will be equally converted into the acetate of silver). Then pour off the acid water and save it (for this acid water has released still more silver from the prints), and then wash the prints in three or four more changes of water, so as to remove the bad smell of acetic acid from them. It is very necessary that the prints be washed well after acidifying, because, if the superfluous acid water be not well washed from them, false, deceiving tones will be obtained in the toning bath, which will in a great measure be destroyed in the further operations with the prints. The tone will be a superficial and uneven one. The prints are finally sufficiently washed for the toning operations, when, upon smelling them, there is only a very slight vapour of the acetic acid given forth.

GERMAN CORRESPONDENCE.*

THE DULL SEASON.—AMERICANS IN GERMANY.—RETOUCHERS AND RETOUCHING.—OBERNETTER'S METHOD OF MAKING TRANSPARENT POSITIVES.—VENUS EXPEDITION.—PHOTOGRAPHIC RESEARCHES WITH THE SPECTRUM.

WE are now in the midst of the dull season. In spite of the cold summer and incessant rainy weather the metropolis gradually gets empty. The can-get-aways go to the watering-places or to the mountains; and gradually our galleries assume a deserted look; only now and then a timid stranger puts in an appearance with the red Baedecker or the brown Murray in his hand. Amongst our visitors are many Yankees, who ask for a ferrotype or even a porcelain picture, neither of which are made here. Whilst writing a caravan of forty ladies is staying in Berlin, and all of them have been immortalised in the shape of Berlin cards.

"Do you consider the Berlin pictures superior to the American ones?" I asked a young American lady who had her picture taken. "Oh, no," she answered, "I consider the American ones better, and only get a picture here so as to show my countrymen how far we are ahead in photography." Such patriotism is very acceptable. I have always met it in the American ladies. "Do you know Mr. Rocher, of Chicago?" inquired another lady. "Yes, madam, very well," was my reply. "Is he not the first photographer in the world?" exclaimed the lady. "No, that is Mr. Scholten, of St. Louis," replied her friend, a resident of St. Louis. You see that the American photographers are very well defended here; and I would propose that, at a future international exhibition (1885, in Berlin???), America should send female jurors only—young and handsome preferable.

* *Philadelphia Photographer.*

Although business is very dull our Society has not been idle; the summer meetings were even better attended than the winter ones, and recently a very animated discussion was devoted to negative retouching, but this time the discussion did not turn on technical matters but on the retoucher himself. The cause was the fate of several retouchers, who, relying on their art, had opened galleries for themselves, and, in spite of their skill as retouchers, had failed of success, because their manner did not please the public, or they did not possess the ability to pose and light a person rapidly and properly, or because they lacked business ability. These facts have demonstrated that to carry on a photographic business more is necessary than merely technical skill. On the other hand it was maintained that the proprietors of many galleries are good business men, and know how to make money, but do not possess any knowledge of art, and expect of their retouchers impossibilities. It is certain that photographic negative retouching does not exercise a beneficial influence on the photographer. Fritz Luckhardt, in Vienna, states that he had a first-class artist as retoucher who, in the beginning, made excellent work, but afterwards displayed a tendency to make everything smooth, and even to remove the characteristic lines. This is not brought about by want of taste or knowledge of art, but is due to the fact that the eye becomes dulled by use, and the opinion is general that no one can stand it longer than ten years. Herr Prümm employs his retouchers for half a day on the negative and the other half on the positive, and states this change enables his workers to last much longer. Lately a reaction against excessive retouching has set in. A number of photographs from 1862 were exhibited, at which time retouching was unknown, and the opinion was generally expressed that, artistically and in point of reproducing the characteristic features, they were fully equal to the productions of the present day. Retouching is now curtailed by many, and I have particularly to mention an artist by the name of Technor who makes excellent portraits, which he retouches only with a few lead-pencil lines.

We have learned also that no artificial light effects are necessary in order to produce a characteristic portrait. Side-light pictures, Rembrandts, and other tricks have long been laid aside.

Another important chapter which is discussed a good deal is the reproduction of negatives. The labours of Obernetter in this branch cannot be over-estimated. Of course not everybody will obtain good results with his process, but the matter is of such great importance that no one should give it up if the first attempts are unsuccessful, as perfection can only be acquired by practice.

Obernetter has recently published a process of making a positive from a negative by means of the dust process. This process is not as important as the other. The making of negatives from a positive may also be made with little trouble by the collodion process; besides, the time of making positives by this process is, according to Obernetter's statement, longer. The method itself is not new, and was originated by Poitevin. The latter took a solution of chloride of iron and tartaric acid, coated with it a plate of ground glass, and when dry exposed it to light. The light reduces the sesquichloride to a chloride; the latter when exposed to the air attracts moisture, and pigment powder dusted over it adheres to the same.

Obernetter recommends for this process the following mixture:—

Citrate of the oxide of iron	10	grammes.
Citric acid	5	,,
Sesquichloride of iron, concentrated solution	2	,,
Water	100	,,

The citrate of iron is finely pulverised, placed with the other ingredients in a flask, heated to boiling, and left to stand until the citrate of iron has dissolved; when cold the solution is filtered. The plates which are prepared with this solution are slightly warmed, coated, and dried in a drying oven. In from five to ten minutes the plate is dry, placed while still warm in the printing-frame on the negative, and exposed in the sun for from eight to ten minutes, and in the shade for one hour. After exposure breathe upon the plate, when a feeble image will appear. By means of a brush plumbago or red oxide of iron is dusted over the plate. Obernetter states that it is easier to dust such a plate than one prepared with chromate of potash. When the plate has been dusted it is coated with plain collodion, placed in water for four minutes, when the film is removed and transferred to another surface. If the picture is to remain on the original surface a threefold diluted solution of iron is used in the preparation of the plate, and the plate is coated with castor oil collodion and left to dry. The picture can be varnished.

The expeditions for the observation of the transit of Venus are starting. On the 22nd one of our parties started in the man-of-war "Elizabeth" for Kerguelen Island, and will meet on this uninhabited group of islands the English expedition and your countrymen, and lead for at least eight weeks a scientific Robinson Crusoe life.

In two weeks the second expedition starts for Auckland Island, south of New Zealand. This one Krem, of Dresden, accompanies with his son as photographer; and four weeks later the expedition for China departs, with which I intended to sail, but unfortunately my obligations here make it impossible for me to be absent seven and a-half months. I regret that I shall not be able to give to your readers photographic reports of India and China, but hope to find here sufficient material.

My credulity is somewhat shaken when I read that not only your honoured townsman, Mr. M. Carey Lea, but also my honoured colleague, Dr. Monckhoven, enters the field against my discovery of the action of yellow and red rays on bromide of silver. He has repeated my experiments, not with coloured glasses, but with the true, real, genuine spectrum, and has nót obtained my results; yes, and he asserts that in the Ecole Normal in Paris, and in Bunsen's celebrated laboratory in Heidelberg, my experiments have been repeated without success. An anonymous writer* in THE BRITISH JOURNAL OF PHOTOGRAPHY speaks to the world in the following manner:—"Messrs. Carey Lea, Spiller, and others have given the final *coup de grace* to this notion of Dr. Vogel, and his fine theory of a prolongation of the action of the more refrangible rays of the spectrum must henceforth be relegated to the limbo of photographic abortions."

First executed and next banished (relegated), fortunately I have suffered both proceedings from the distance without any inconvenience or damage, and have even, as an executed exile, the impudence to continue my experiments. If I had only tried two or three plates with the spectrum a doubt might be possible; but when two to three hundred experiments have been made with absolutely the same results there must be something more in it than a photographic abortion.

Photographic spectral experiments are rather difficult to make. They cannot be repeated with coloured glasses, for these colours are impure, and experiments with impure colours belong to the same category as a chemist who wants to make a chemical analysis with impure chemicals. The objection that the spectral colours are not always pure either is not valid, for the same can be said of the "pure" reagents of the chemist.

Dr. Monckhoven has experimented with pure spectral colours, and did not obtain my results. The explanation is easily found. Dr. Monckhoven's spectroscope had a slit seven and a-half times smaller than the slit of my instrument; hence seven and a-half times less light entered his instrument than mine. Further: he elongated his spectroscope to forty centimetres—that is, he made it seven times longer than mine, and the consequence was that his instrument was fifty times more feeble in light than mine. Now, with my instrument of great intensity of light I had to expose for three minutes in order to obtain an impression in yellow. Dr. Monckhoven would have obtained the same result if he had exposed for 3 × 50 minutes, or one hundred and fifty minutes. Instead of that he states that he exposed for two minutes only.

Dr. Monckhoven is in the position of a photographer who wants to try a very sensitive instantaneous collodion, and employs for the purpose a slow-working landscape lens of feeble light.

I have to mention still another mistake. Dr. Monckhoven probably coloured his plates too highly. An intense colour is not beneficial but objectionable. Each particle of bromide of silver is surrounded by an envelope of coloured collodion. If the colour is too intense the light is weakened too much by being absorbed by the envelope, and cannot, therefore, act with sufficient energy on the bromide of silver. A weak colouring, which can only be established by experiment, is the only way to success. H. VOGEL, Ph.D.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE meetings of this Society were resumed on Thursday, the 10th instant,—Thos. Heywood, Esq., V.P., in the chair.

The minutes of the previous meeting were read and confirmed, and Messrs. Thos. Chilton and J. T. Chapman elected members of the Society.

Messrs. Wade and Payne were elected auditors for the year.

Mr. John Brier, Jun., exhibited a series of excellent prints, chiefly from wet collodion negatives. All the skies were printed from beer and albumen negatives. Mr. Brier had not found that process very reliable.

Mr. Atherton exhibited a number of views taken by Mr. Kershaw, of Buxton, showing the capabilities of Ross's symmetrical lens. All the negatives had been taken on wet collodion, and some of them, Mr. Kershaw said, had been kept three and a-quarter hours before developing by simply wrapping the slide in a damp cloth.

The meeting was then adjourned.

Correspondence.

M. VIDAL'S POLYCHROMIC PROCESS.

To the EDITORS.

GENTLEMEN,—In M. Vidal's letter, which appeared in your last week's number, he states that neither Paris nor England has yet appreciated the practical value of his process.

How far this may apply to Paris I cannot say, but as regards England the absence of specimens must relieve us from that reproach. With the exception of two or three very small specimens sent to you by Mr. Sutton, I question if any others have been seen in this country. At all events, no public display of them has brought M. Vidal's results before the eyes of English photographers. Indeed, I doubt if one photographer in a hundred has any distinct idea of what they are. Mr. Sutton, it is true, with his usual enthusiasm for anything new, has for some time past frequently alluded to them in the highest terms of commendation, and through your courtesy I have had the opportunity of inspecting the few specimens he has sent you.

However much I may admire M. Vidal's ingenuity, perseverance, and zeal in this matter—and they are worthy of our highest admiration—I must confess the results sent you by Mr. Sutton do not rouse in me the same amount of enthusiasm in their behalf which they do in him. To prophesy is dangerous; but to my mind the specimens sent are not suggestive of much promise for the future. We should, however, all be glad to see more before we venture on a definite opinion; and a frame of good specimens would form an object of deep interest at the next photographic exhibition. It is due to M. Vidal that the English public should have the opportunity of passing judgment on the merits of his work.—I am, yours, &c., P. LE NEVE FOSTER.

September 14, 1874.

SPIRIT PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I am at present residing in a wild part of the Highlands, where the human face is a rare article; and the only spirits to be encountered come in the shape of "mountain dew." The ghosts of Ossian seem to have become a mere tradition; and I have not been able to find even one performer in the "second sight" line. How the sons of Fingal have degenerated!

In such circumstances it was with great delight that I read, in your Journal, the letter of Mr. S. C. Hall concerning a photograph of his father's spirit. I admit that if the statement had been made in a witness-box the counsel would have asked him some ticklish questions; but the statement is made with such transparent simplicity that it cannot fail in bringing conviction to every candid mind. It has so wrought on me that I am determined to begin experiments immediately on my "own hook."

Mr. Hall's statement is too long for quotation; but, in effect, it conveys that he was sure of the likeness by the head being bald, with a *queue* hanging down the back, although "the face was so obscure that he could not determine the likeness by the features." It is interesting to note how the filial instinct seizes on the parental *queue*. I wonder if it would have been as successful if the bald head had been covered with a spiritual wig. Perhaps some debating society will kindly discuss the matter and favour you with the result. As my chief failing is an unsatiable curiosity, I must take the liberty of wishing that some one would examine the photograph with a powerful lens, to see if the spirit still dresses his *queue* with pomatum, and if the earthly tape which originally bound it is still to the fore.

A notable point to remark is that no *medium* was present. This is a great advance, and leads us to the hope that soon we may be able, without any go-between, to summon up at pleasure the spirits of antiquity. Happy the man who could have half-a-minute with Adam! He would make his fortune in a week. No doubt there would be a difficulty in establishing the individuality; for, perhaps, he did not wear even a *queue*.

Unfortunately I sprained my ankle yesterday, having stumbled in an attempt to pronounce some Gaelic words; but, as I can have the loan of a blind *shelty* from a blacksmith who lives in a neighbouring *clachan*, I shall proceed tomorrow to a photographer, who I am told resides at a distance of thirty miles and "a bittoch;" that is to say, I—a lame man on a blind charger—shall have a journey forty miles at least over moss and moor, but, feeling the greatness of the occasion, I shall proceed with a sandwich, flask, and pipe in my pocket, "bating no jot of heart or hope."

As it seems the fashion for spirits to keep their features obscure, I shall send you an exact account of the cut of their garments, trimmings, &c., which I am well able to do, having once served an apprenticeship to a haberdasher; that is, always, if they have the decency to wear any. I shall also send a note of the same to the Society of Antiquaries, hoping that it may go far to settle the vexed question as to the time when the kilt was introduced. I may mention that the kilt is almost as extinct as the dodo. I have only seen one in the Highlands, and it was worn by a gentleman who misplaced his *h's*. Alas! the calves were the calves of John Thomas, though the dress savoured of "Tuncan, Tonald, and Tugald."—I am, yours, &c., SCOTTICUS.

Pass of Queyhanhulich, September 14, 1874.

P.S.—I am determined to have three ghosts up at anyrate. I greatly wish one of them would appear with a bagpipe. It would be very consolatory for the lovers of music to know that such an instrument awaits them in the spirit-world.—S.

* The "Peripatetic Photographer."

ANSWERS TO CORRESPONDENTS.

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

D. Winstanley.—In our next.

P. J.—The firm of Bolton and Co., of Holborn, has long since ceased to exist.

Harry.—Apply a little powdered pumice stone with which is mixed flake white.

Inquirer.—So far as we know nothing but pictures will be admitted to the exhibition.

V. B. L.—The sediment must first of all be removed by filtration, and the clear liquid alone used.

H. Korn.—We have not received any official information regarding the composition of "tunicare."

A Welsh Reader.—If the flocculent matter be removed by filtration the liquid will act almost as well as it did when first prepared.

Christoph Abr.—We are aware that such cameras as that described have long been in use. Indeed, their previous existence was recognised.

Medicus.—Numerous physicists believe that the three primary colours are not blue, yellow, and red, as heretofore commonly imagined, but purple, red, and green.

Tyro.—The transparent spot upon your negative is doubtless caused by your having poured on the developer at that place. Try the effect of pouring it along the margin.

Carbon Experimentalist.—About twenty grains of bichromate of potash is said to destroy human life. We do not, however, speak from experience, not having tried the experiment.

New Photographer.—1. A portrait combination will answer for taking groups, but you must employ a stop with it.—2. The *Manual of Silver Printing* by "Aliquis," price one shilling, will answer your purpose.

W. H. Wood.—Several articles on the preparation of collodio-bromide requiring neither washing nor preservative have appeared in this Journal. By following the directions given success will be certain. The alkaline method of development must be employed.

G. Williams.—Upon testing the water with permanganate of potash we found it contained a very large proportion of organic matter. We cannot undertake to make a minute analysis. This you must do yourself or secure the services of a professional analyst.

Geo. Hay.—In estimating (approximately) the focus of the single landscape lens, focus upon a distant object and then measure from the convex or posterior surface to the ground glass. The focus of the two other lenses may be measured from a point about half way between the two lenses.

Harrisoniensis.—Try the following method for sweetening or partially purifying your methylated alcohol:—Arrange an apparatus as for the continuous distillation of ether and then distil the alcohol, having previously added to it sulphuric acid in rather less proportion than that required for perfect etherification.

W. Ward.—The ink used in the printing of Woodburytypes is gelatine coloured with any suitable pigment. It is poured in a fluid state upon the mould, after which the paper is superimposed and backed by a flat plate of glass. Pressure is then applied, by which all the superfluous ink is squeezed out around the margin.

Stillman's Amateur's Photographic Guide Book.—In reply to some queries having reference to the publication of this excellent treatise on photographic processes, we observe that it is now published by Mr. M. P. Tench, at the same address as that of the former publishers, Messrs. C. D. Smith and Co., 153, Fleet-street, London.

S. B. B.—The objection to the method of operating you propose lies in the fact that, if the paper be albumenised previous to its being rendered sensitive on the bichromate solution, the albumen will, in the act of sensitising, be dissolved from off the surface. The remedy for this consists in applying to the surface of *plain* paper a solution of albumen and bichromate.

Rev. B. S.—We must decline offering any opinion whatever upon the letter of Mr. S. C. Hall published in our last issue. As our readers are doubtless aware, we devoted a considerable portion of our time, two years ago, in trying to ascertain whether there was any truth in spirit photography or not; but the results we obtained, after a trial extending over several weeks and under most favourable circumstances, were not such as to warrant our accepting spirit photography as one of the facts proved to our satisfaction. We should be very chary indeed in pronouncing upon what is possible and what is impossible; we merely state that, from the results of such investigations as we made, spirit photography has not, in our hands, proved to be a reality.

J. Davis (Manchester).—We cannot better answer your query respecting the best paste with which to mount photographs so that they will not cockle than by giving an extract or two from the works of writers of acknowledged reputation:—Mr. Jabez Hughes, in his *Principles and Practice of Photography*, says—"Hot thin glue may be used to mount them on cardboard, but starch, such as used for household purposes, and about the same consistency, is equally adapted. It should be used cold. To complete them they should be sent to the hot pressers, who for a small charge will glaze them by rolling, which communicates a highly-finished appearance." And "Aliquis" (Mr. Wilson), in his treatise *On Silver Printing*, says—"Avoid any kind of paste or glue that has acid in it, or which is known to be likely, under ordinary conditions, to develope it. Both flour paste and starch are distinctly subject to this defect, and if used at all must be used fresh. Probably the best thing to use is pure gelatine. * * Most of the ready-made substances have the danger attached that they may be acid; but one or two are not, and are handy for amateurs and for mounting in scrap-books with. Among such, a substance called 'parlour paste' is one of the best. India-rubber preparations should never be used for scrap-book work. The prints adhere only for a few months, perhaps, and then fall away, the adhesive power of the rubber being destroyed." From the foregoing you will be able to select such a method of executing the order as will be satisfactory.

Omega.—The picture is certainly quite as bad as you describe it to be. As regards the sources of its imperfections, while we cannot pretend to indicate them all, bad focussing seems to have a good deal to do with it, while most of the remaining causes are to be found either in the use of the materials which give too much intensity, or in imperfect exposure and development.

W. S. A.—You have not correctly understood our meaning if you imagine that we have advocated the use of one lens in preference to two. The pith of our argument was this:—Use a *pair* of lenses if you have them; but if you only possess one lens of any definite focus that lens may be used for taking stereoscopic pictures by having it mounted upon a sliding front. For obtaining instantaneous pictures it is obvious that this arrangement will not answer any better than would the original stereoscopic camera of Mr. Latimer Clark.

Received.—G. W. Webster, F.C.S.; W. U. In our next.

Dies for Cameo Vignettes.—Mr. J. B. Payne, of Manchester, acting upon a suggestion made some time ago in this Journal, has introduced a modified form of die of great efficiency and simplicity. It consists of two pieces of hard, close-grained wood, one of which is provided with guides for the reception of the other, into which is cut an aperture of the form and size of the intended relief or raised portion. A thick piece of india-rubber is interposed, and the act of converting a plain into an embossed picture is one of extreme simplicity, for the die can be used even in an ordinary copying press. As its construction can be understood much better by means of a single glance at it than by mere verbal description, we shall allow the specimen sent to us to remain for some time at our office, where it may be seen.

The Photographs of the Prince Imperial.—We learn from the London daily papers that the Correctional Tribunal of Paris has just been engaged in hearing a charge brought against M. Guérard, dealer in photographs, Rue de Rivoli, and M. Vallentin, photographer, Rue Méchain, on a charge of committing an infraction of article 22 of the decree of the 10th February, 1852. By the terms of that law no drawing, engraving, &c., can be published, exposed, or sold without the authorisation of the Minister of the Interior. In the present case the incriminated articles were photographs of the Prince Imperial. M. Guérard had applied in due course for permission to introduce into France 300,000 chromo-lithographic portraits of the Prince, which were to be executed in Belgium, and of those he had received 150,000. Those had been distributed in the provinces, and had given rise to the question addressed by M. Ernest Picard to the Government at the late sitting of the Committee of Permanence. But others, although unauthorised, had also been distributed, and the police, after some search, had discovered that they came from the defendants. At the moment the commissary entered the premises of M. Vallentin he was found pasting photographic copies of the portraits on cards. In his defence he said he was not aware that he was doing wrong; he had received an order from M. Guérard, who admitted the fact, and declared that he was supplying them to M. Haentjens, who asserted that they were duly authorised, and he produced a letter from that gentleman, affirming that the Marshal President had himself given permission for 100,000 of those photographs. The advocate of the defendants declared that the object of the law was to prohibit portraits which bore emblems in such a manner as to indicate a pretender, but those in question had none as the Prince did not set himself up as a pretender, and had no occasion to do so. The court found the accused guilty, and sentenced M. Guérard to a fine of 500f., and M. Vallentin to one of 100f., and further ordered the confiscation of the proofs and negatives.

METEOROLOGICAL REPORT,

For the Weeks ending September 16, 1874.

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

These Observations are Taken at 8.30 a.m.

Sept.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
3	30·03	SW	58	61	65	53	Dull
4	30·00	W	52	57	65	50	Fine
5	30·10	W	51	53	67	45	Dull
7	30·10	W	55	56	67	51	Dull
8	30·08	W	57	60	69	51	Cloudy
9	29·67	SW	57	60	—	52	Cloudy
10	29·68	W	48	52	65	43	Fine
11	29·84	W	53	55	65	47	Raining
12	29·68	W	55	59	66	50	Cloudy
14	30·42	SE	52	55	68	47	Dull
15	30·24	SW	54	57	69	47	Cloudy
16	30·08	W	56	59	—	50	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 751. Vol. XXI.—SEPTEMBER 25, 1874.

REMOVING HYPOSULPHITE OF SODA FROM PRINTS.

Having given our readers a week to cogitate over the somewhat unsatisfactory method of removing hyposulphite of soda from prints by the agency of alum, as proposed by Mr. Clemons (see our subleader of last week), together with the still less satisfactory but, alas! only existing method for eliminating free sulphur which was hinted at by us, we now proceed to examine broadly the subject of the removal of hyposulphite with the view of showing that there is no necessity whatever for bestowing thought upon the alum remedy—first, because by adopting ordinary preventive measures the disease cannot exist at all; and secondly, because when it does exist, or, more properly speaking, in those cases where it has been allowed to break out, there are substantial remedies of a more effectual and less noxious character than the nostrum last recommended.

First of all, we shall examine the means of preventing the disease, or, in other words, the elimination of the hyposulphite of soda by simple washing. What takes place in the fixing of a print is this:—The picture is immersed in a solution of hyposulphite of soda, which acts upon the chloride of silver in the print by converting it into hyposulphite of silver, this last-named salt being dissolved by an excess of hyposulphite of soda. Sometimes, however, the fixing bath is too weak, or an insufficient degree of time is allowed for it to act properly, in which case the hyposulphite of silver remains in the print, and soon begins to decompose. To realise this let a print be immersed in a rather weak fixing bath for a short time, and, after being taken out and washed slightly, let it be plunged into a vessel of warm water. Observe the rapid formation of sulphide of silver! The picture has almost immediately lost the fresh appearance it possessed previous to its treatment in the hot bath, and has now become of a sickly, yellow hue. As the hyposulphite of silver is dissolved by a strong solution of hyposulphite of soda the remedy is obvious. See that the fixing bath be of sufficient strength; and see, further, that the print be allowed to remain in it for a sufficient time.

The first step, then, towards securing well-fixed prints is to avoid a parsimonious and fatal economy in both the constitution of the fixing bath and the time allowed for its proper action.

The next question for consideration is the removal of the soda after it has done its duty in the manner described. Being freely soluble in water, one would at first sight imagine that the elimination of the fixing agent from the print was a matter of extreme ease. Well, so it is; but there are a few obstacles in the way of its ejection which require care in their removal. First of all, the soda permeates every pore of the paper, and it takes a rather long time for the water to reach it and reduce its strength to such a degree as to render its presence undetected by any chemical test; for in these advanced times, when the "divisibility of matter" forms a current subject of thought, it might be unsafe to speak of its *absolute* removal by means of washing, no matter how protracted it might be. Between practical removal and absolute removal there is a distinction without much difference.

It is generally agreed that, while a too short washing is bad, a too prolonged washing is also unadvisable. But there are methods by removed so as to elude the application of the best-known tests. which, after a very short washing, the hyposulphite of soda may be Among these we may mention a method we saw, several years ago, applied with great success, but which is scarcely known in practice at present, owing, probably, to the fact that the treatment has to be undergone by each print separately instead of being applied to large masses of pictures. Two pieces of smooth board were hinged together. The under surface of the upper one had a soft pad nailed upon it, and a hole cut through so as to admit of the insertion of the end of a large funnel. The print was placed upon the lower board; into the funnel was poured water, which percolated through the pad on to the print. By means of a handle the upper board was moved up and down as if it were a pair of bellows; thus intermittent pressure and a flow of fresh water soon removed the hyposulphite of soda. Two or three minutes sufficed to wash a print thoroughly.

The action of a soft padded roller, accompanied by a flow of water, also proves an energetic remover of hyposulphite; so does the intermittent subjecting of the prints to pressure between boards in a screw press. We were present when, after several prints had been washed for four minutes in a Grisdale's washing machine, two of them were taken out, boiled in distilled water in a test tube, and crucially tested for hyposulphite of soda without any being discovered. This machine acts by driving a strong current of water through the pores of the print.

So much for the elimination of hyposulphite of soda by mechanical or, so to speak, natural means. Our next inquiry is in connection with the destruction of the hyposulphite by its being converted into some other substance.

While there are several methods by which this end may be accomplished, there are three, in addition to that mentioned last week, which have been known for several years and have been more or less rather extensively practised. One especially—which was expected to terminate for ever the ills of silver printing—was a method proposed in 1866 by Dr. Angus Smith, of Manchester. Premising that the prints should previously have received as complete a washing as it is convenient to give them, but that a trace of the hyposulphite still remained lodged in the pores of the paper and could not be dislodged by ordinary washing, the discovery of Dr. Smith consisted in finding a simple means by which that trace of hyposulphite should be converted into the sulphate. He found the remedy in peroxide of hydrogen, which undoubtedly possesses this property. The manner of applying this attribute to photographs is to pour a few drachms of it into a quart of water and immerse the prints for a few minutes, afterwards rinsing them in pure water. We have submitted prints thus treated to the test to be afterwards described; but in no case have we been able to discover the slightest trace of hyposulphite. The presumption, then, is that benefit should result from the treatment to which we have referred.

But it has also been shown by Mr. Hart—and that at a date anterior to the communication of Dr. Smith—that hypochlorite of soda will oxidise the hyposulphite in a most effective manner; and, arising out of his discovery, "Hart's eliminating fluid" has since become well known as an article of commerce. It is certainly quite as effective for this purpose as peroxide of hydrogen, while it is much cheaper.

A method proposed by Mr. Tichborne consists in treating the prints with a solution of chlorate of barium acidulated with perchloric acid, which is tantamount to using a weak solution of the acid. As long as there is any hyposulphite present, this substance on oxidation into sulphuric acid sets free a fresh portion of acid from the chlorate of barium, and the reaction is thus sustained until the hyposulphite has been completely oxidised.

With regard to the merits of these respective methods it is not our intention here to speak. Although they were much desiderated and very generally practised at the time of their introduction, they have since been generally, if not altogether, abandoned by photographers, who appear to look for safety to a thorough washing rather than to the aid of chemicals which, while undoubtedly hostile to the existence of the hyposulphite, may, if used unskilfully, prove equally antagonistic to the print itself. The powerful bleaching properties of peroxide of hydrogen are now well known, owing to its having been pressed into the service of the toilette for the purpose of converting the dark or raven tresses which before adorned the heads of silly actresses and *buffet* attendants into locks of the more fashionable flaxen or auburn tint.

For practical purposes, then, a thorough washing in plain water will remove the hyposulphite sufficiently well. The first requisite is to use the fixing bath of a proper degree of strength and for a sufficient length of time; its after-elimination presents no difficulty.

It may be desirable to conclude by indicating, for the benefit of inexperienced printers, how they can ascertain when a print has been washed sufficiently, or, in other words, when the hyposulphite has been removed. Proceed thus:—Hang the print up to dry and collect the droppings in a wine-glass. Now, in a watch-glass place ten drops of cold, thin, boiled starch, to which add two drops of an aqueous solution of iodine, or sufficient to cause a pale violet-blue colour to be developed. Mix with this ten or fifteen drops of the washings from the wine-glass, and if there be any hyposulphite of soda present the blue colour will be discharged; but if free from this salt the colour will remain unchanged.

ON COPYING PENCIL DRAWINGS.

Those of our readers who have been employed to make negatives from pencil drawings know that it is a difficult matter; in fact, one of the most perplexing problems the photographer has to solve. A restless baby, a playful dog, or a varnish-cracked oil painting are, each in its way, troublesome enough; but the difficulties of all combined fall much short of that which an operator has to face in his attempt at the reproduction of the apparently-delicate lines produced by the blacklead pencil. We say "apparently" delicate lines; because if such lines be examined under a tolerably high power they will be found to be not continuous lines at all, but to consist of particles of powdered graphite scattered irregularly over the surface of the paper, being deposited principally in the deeper cavities, while the shallower cavities and the ridges are left white. In consequence of this—even if the graphite were thoroughly opaque and could absorb all the light that fell on it—the amount of white paper of which those shallower cavities and ridges are made up reflects sufficient light to make the lines in reality a rather light grey. In addition to this, however, the graphite itself is a most unsuitable material for photographic work, as it is, except perhaps in the densest parts, sufficiently transparent to allow the light to be reflected from the paper underneath, and this to such an extent in the more delicate shadings that it is hardly possible to produce them in the negative at all. If to this we add the fact that even where the graphite, from its presence in greater quantity, is tolerably opaque, it yet, in consequence of its glittering surface, reflects a large quantity of white light, it will be evident that we have not overstated the difficulty of the operation.

During the past week our attention has been directed to the subject in consequence of the application of a friend for aid in such a difficulty. One of our eminent physiologists is about to publish a work on a somewhat controverted subject, and had prepared for its illustration a number of *camera-lucida* drawings from microscopic sections. Being unwilling to trust them to the tender mercies of the engraver, he employed our friend to make negatives, with a view to getting them printed by one of the carbon processes. Our friend, who had not previously tried his hand at such work, readily undertook the commission, and promised to deliver the forty negatives within three days. We need hardly state that the promise was not kept, as he came to us at the end of a week with a most lugubrious countenance, regretting he had ever seen the Professor, and threatening to throw up the whole affair in disgust. Of course we willingly agreed to render him assistance, and, after a series of experiments, were able to show him a method by which the work has been done to the satisfaction of all concerned, the negatives giving silver prints of great beauty, the whites being perfectly pure, and the lines, although not quite black, sufficiently so for all practical purposes.

We need not trouble our readers with the details of the experiments made, or of the failures which for some time were the only result. It will be sufficient to explain the method which was found to be most suitable and by which success was ultimately achieved.

Of course the first step was to destroy, as far as possible, the glittering surface of the graphite. This was readily and satisfactorily done by floating the drawing, face down, for half-a-minute on a dish of skimmed milk. It was then pressed tightly into an ordinary printing-frame, and copied through the glass. A great deal depends on getting a suitable collodion; that which was found to answer best was made with a very powdery pyroxyline, and contained two grains each of cadmium iodide, ammonium iodide, and ammonium bromide per ounce. The collodion had been kept for about a month, and to three parts of it was added one part of a sample prepared in the same way, but at least six months old, the mixture being about the colour of dark sherry. The plate received two coats of the collodion, poured on and off at opposite corners with a view to the production of a film of equal thickness throughout, the first coat being allowed to set about as long as if it had to be placed in the bath before the second was applied, and the second was allowed to set *well* before the plate was put into the bath. The resulting film was thoroughly opaque, and in consequence, we think, contributed in no small degree to subsequent success. The bath contained forty-five grains of silver nitrate per ounce, and to sixty ounces of it was added one ounce of glacial acetic acid. The exposure was made in an ordinary ridge-roof glass-house, with all the curtains closed except 3×6 feet at one side and 3×9 feet at the top; and, as the light was pretty uniform during the copying of the whole of the drawings, an average exposure of twenty-five seconds was given. The lens was a portrait combination three and a-half inches diameter, and eight inches focus, with a stop of half-an-inch.

Although the collodion and bath have much to do with success, the real secret, doubtless, lies in the method of development, no system of intensification or building up of the image being admissible, as it invariably tends to fill up the more delicate lines. What is required is to get by a first application of the developer a structureless and non-granular deposit of silver on all the whites, leaving the lines indicated simply by clean glass, and then by chemical means to convert this metallic deposit into some salt of silver that will be sufficiently non-actinic to obstruct the passage of light till the lines are printed. This was easily effected in the following way:—

The developing solution consisted of iron protosulphate 300 grains, glacial acetic acid six drachms, alcohol half-an-ounce, gelatine thirty grains, water twenty ounces. The gelatine was softened in a little water dissolved in the acetic acid, and added to the solution of iron and alcohol. To each two parts of this was added one part of a thirty-grain solution of iron ammonia-sulphate, which had remained for at least six months on a shelf in the laboratory, and was in colour as dark as port.

Experience showed that when the proper exposure was given this developer brought the image into view in about twenty seconds after its application, and that it continued gradually to acquire intensity for a period of from three to four minutes. At this stage—when examined by reflected light—the lines of the drawing were of a bright yellow, and the rest of the plate of a dark opaque grey. If the development be pushed beyond this stage there is a tendency to the filling up of the finer lines; it should, therefore, be stopped just short of that, and, after thorough washing, be fixed with cyanide.

The image, as we have already said, consists now of finely-deposited silver, with probably a trace of organic matter in addition to the collodion film; and, although much too thin to prevent the transmission of light, it is yet sufficiently thick to form a bright mirror, if gently rubbed, when dry, by the finger, and in quite sufficient body to form, when combined with some of the non-metallic elements, a salt of silver of such density and colour as to be opaque to actinic light. For this purpose the very beautiful reactions proposed by our esteemed correspondent, Mr. M. Carey Lea, in volume xii. of this Journal—in which the silver is first converted into the chloride, and then acted on by Schlippe's salt, which produces a rich scarlet negative, admirably adapted for printing—was adopted. The method of application was as follows:—The fixed and thoroughly-washed plate was immersed in a solution consisting of potassium bichromate thirty grains, acid hydrochloric three drachms, water twenty ounces, and allowed to remain until the full effect had been produced. It was then again thoroughly washed and immersed in a solution of Schlippe's salt, containing twenty-five grains to the ounce, which almost instantly changed the white chloride into the desired deep scarlet.

We may add that, to secure adhesion of the film during the various operations, the plates received a preliminary coating of albumen; and that, so simple and certain is the whole method, in the space of one hour we saw our friend, unaided, produce eight perfect negatives without a single failure.

STRANGE CHEMICALS.

Perhaps there is no art where less attention has been paid to the facilities of commerce than in photographic art. A glance at the list of photographic chemicals will render this apparent at once. Chemicals and preparations by the dozen, unknown except to the man of science, and even to him only by name, appeared coeval with the rise of the collodion process. Many of them are still in use, and remain only in the remembrance of the experimental photographer; but, still they

"Come like shadows, so depart."

It sometimes puzzles one to know where the photographer got the specimens of the compounds which he recommends his brethren to try; but occasionally these strange chemicals prove invaluable. Thus, in the article by Colonel Stuart Wortley on *Photography in Connection with Astronomy*, we find fluoride, malate, and succinate of silver recommended, the use of these and other silver salts being introduced to prevent blurring.

Now, either of the last two might be classed as a *rara avis in terris*. No mention will be found of them in the lists of the most scientific of manufacturing chemists; and we have no doubt that any adventurous experimentalist who may wish to try these experiments will be as much puzzled on applying to his chemist as the chemist to receive his order for succinate of silver. In fact, neither malic or succinic acid have, so far, ever received any technical application, and are therefore unknown in the commercial world. As in the case of all similar substances, create a demand and immediately the supply will follow. Therefore, if the chemicals we have mentioned be found as useful as Colonel Wortley thinks, there will be no difficulty in procuring them after a short period. In the meantime we will give a slight sketch of these two substances and their salts.

Succinate of ammonium is the only compound which will be found in commerce, because some years since it was proposed as a test for iron, but it never came into general use.

Malic acid is very generally diffused throughout the vegetable world, although in some cases it occurs but in small quantities, associated with other vegetable acids, such as citric. It is present in the barberry and other berries of this class, but most plentifully in unripe apples, the house leek, and mountain ash berry. The last-named substance is the best berry to make it from. Malic acid, when viewed as an acid, is bivalent. It is sometimes called "triatomic;" but, as it has only two atoms of replaceable hydrogen, it must be considered as having the following formula, in which "M" represents a monad:—

$C_4\,H_4\,M_2\,O_5$ Neutral malate. $C_4\,H_5\,MO_5$ Acid malate.

Malic acid, as procured from the mountain ash, is found crystallised in needles, which form groups or wart-like masses. They melt at the temperature of boiling water, and do not suffer any loss of weight at 120°. They are odourless, have a sour taste, and are deliquescent. They are also soluble in alcohol.

There is a reaction which, probably, accounts for the similar results obtained, when succinic or malic acid is used to control the blurring. When a malate or malic acid is submitted to the action of a reducing agent it is converted into succinic acid; also, when a soluble malate is submitted to the action of a ferment, it is converted into the corresponding succinate. Therefore we see that these two acids are very nearly allied. The following are the most interesting of the malates:—

Malates of Calcium.—If diluted nitric acid be saturated with carbonate of calcium the solution remains strongly acid, but the bright solution obtained in this manner deposits copious crystals of the neutral salt on boiling. From a solution the monhydrated salts separate after a little time in hard, four-sided prisms, dissolving in eighty-three parts of cold and a smaller quantity of hot water. The anhydrous salt is nearly insoluble, both in cold and hot water.

It may also be obtained by double decomposition with the malate of sodium and chloride of calcium. If neutral malate of calcium be kept for some months under a shallow layer of water, in a vessel covered with paper, it is converted into succinate of calcium. There is not much known about the iron salts of malic acid; but malic acid, like citric or tartaric acids, prevents the precipitation of ferric oxides by the alkalies.

The malate of silver ($C_4\,H_4\,Ag_2\,O_5$) is precipitated either from the neutral or acid salt of ammonium—white when first formed, but which gradually becomes yellow on drying. The acid malate does not seem to have been formed. The silver salt is easily decomposed. On heating it swells up, and, after a little time, nothing remains but pure metallic silver.

Succinic Acid ($H_2\,C_4\,H_4\,O_4$) only differs, it will be seen, from the malic by the abstraction of three molecules of oxygen, and, as we have already stated, may be procured by the fermentation of malate of lime. It was originally got, however, by sublimation from amber, and was first called "volatile salts of amber." It occurs ready formed in that substance, and is also very easily procured by treating fats with oxidating substances. Like malic acid it is a homologue of oxalic, and also, like them, forms dibasic salts. It crystallises in prisms, leaving an acid and very little smell. It is very soluble, particularly in hot water, dissolving in nearly double its weight of that menstruum, and is very insoluble in alcohol, and nearly insoluble in ether. Succinic acid, being dibasic, forms both neutral and acid salts.

Succinate of Ammonium, $C_4\,H_4\,(N\,H_4)_2\,O_4$, is found in the putrifactive fermentation of asparagine.

Succinate of Barium ($C_4\,H_4\,Ba''O$) is a white precipitate, nearly insoluble in water, and perfectly insoluble in ammonia and alcohol. The neutral calcium salt ($C_4\,H_4\,Ca\,O_4\,H_2\,O$) is a crystalline precipitate almost insoluble in water and insoluble in alcohol. The acid salt is nearly identical in its physical properties.

Succinate of Ammonium was at one time proposed as a test for ferric salts. The alkaline succinates give a reddish-brown precipitate of succinate of iron, which is, of course, basic.

Succinate of Silver.—There seems to be two succinates of silver. The argentic salt ($C_4\,H_4\,Ag_2\,O_4$) is procured by double decomposition from nitrate of silver and succinate of sodium; but sulphate of silver will not produce it. The precipitate is white and non-crystalline. It must be quickly washed, because it is, to some extent, soluble in water. It is very soluble in acetic acid, dilute nitric acid, and in ammonia; therefore the neutrality of the solutions used to precipitate is a *sine quâ non*. It becomes coloured at a heat some few degrees above the boiling point of water, and it is instantly decomposed by chlorine, iodine, or bromine. When heated in a current of hydrogen it is reduced and assumes a yellow colour, whilst succinic acid sublimes. This yellow powder is supposed to be the argentous salt. Both the malate and succinate of silver seem to be more or less sensitive to actinic influence.

ACIDS IN THE DEVELOPER.

I have no theory to support in favour of or against the necessity for acids in the developer. With me it is only a question of the fact. Twelve months ago I was a complete victim to the general superstition that acid in the developer was absolutely indispensable. Had I been photographing in the country, and found myself without acetic acid, remote from any shop where I might procure it, I should have applied to the nearest cottager for vinegar, and rested my hopes on that impure form of acid, as I have done before. Experiment has satisfied me, however, that an *intentional* addition of acid to the developer is absolutely needless, and until experiment furnishes me with evidence to the contrary I must adhere to this opinion.

In an editorial article in this Journal, on the 11th of September, the conclusions I have advanced are, in the main, endorsed; but it is suggested that a basic condition of the iron salt, such as will arise from keeping, may possibly render some slight addition of acid necessary in the developer. The reasoning upon which this view is based appeared to me to be quite sound, and the inference that a solution of the basic salt would have a tendency to act much as an alkali appeared to me to be entirely justified. In chemistry and photography, however, I theorise but little. It is so seldom experiment can be forestalled that, when practicable, it is better to appeal to that crucial test at once; and hence, anxious to know the influence of a basic salt, I made the experiments I now record.

A solution of iron protosulphate was prepared and boiled with nitric acid, to peroxidise the iron. An excess of ammonia was then added to separate the oxide, which was cast upon a filter, and well washed. Through this hydrated precipitate of iron peroxide the following solution was filtered about ten times:—

Iron protosulphate	1 drachm.
Water	4 ounces.

The solution after filtration had a straw-coloured tint, and faintly reddened litmus paper—a circumstance which, as the Editors have remarked, is quite consistent with a basic condition of the iron. A plate was then prepared, and, after exposure in the camera, the above solution, with no addition of free acid, was poured upon the plate. A negative was developed for a somewhat protracted time, and, after fixing, carefully examined. It had no trace of fog. A solution of iron protosulphate of the strength already given, but which had stood some weeks and exhibited evidence of peroxidation, was then employed, as in the previous experiment. No acid had been added, and litmus paper was, as before, but faintly reddened. The negative exhibited "most certainly no trace of fog."

A third and final experiment was then performed. Some iron protosulphate crystals, which had lain on paper and been exposed to air for upwards of six weeks, were next employed. They had effloresced into a powder, and the outside of the heap had become oxidised to perfect redness. The whole of this, two drachms in weight, was then dissolved in water, so as to make a solution twice as strong as those already used. The solution was filtered several times, to bring each part in contact with the reddened iron; and, as before, it faintly coloured litmus. A plate developed with this preparation for a protracted time certainly exhibited no trace of fog. The inference is obvious—acetic acid does not need to be employed as a preventive of fog. The mere keeping of an iron solution for some weeks does not render an addition of acetic acid needful. Pouring the plain iron through hydrated sesquioxide, with the intention of making the solution basic, fails to render acid necessary; and keeping the protosulphate crystals exposed to air until effloresced and peroxidised in the extreme, does not prevent their yielding a solution which will develope with immunity from fog without an addition of acid whatsoever.

Experimenting with collodion of unknown composition, I am aware, is scarcely scientific work. It will render my results in some measure of more value to state that the article I employed was that of Mawson's preparation. D. Winstanley.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

While reading the very excellent suggestion of our Editors a few weeks ago as to the desirability of photographers generally aiming at the acquisition of some theoretical and practical chemical knowledge, it occurred to me that a small portion of the Journal might with advantage be set apart for a few instructive hints on the proper use of dark-room or laboratory apparatus.

In succeeding articles I shall endeavour to convey just as much information as will enable the tyro to use his photographic tools intelligently, or the young student in chemistry to employ the various apparatus and utensils he is likely to meet with in a well-appointed photographic laboratory to such advantage that when he advances in knowledge he may come to the study of his text-book with some little training which, elementary though it may be, is quite necessary, and yet perhaps not to be readily found in more pretentious volumes.

Let *cleanliness*, *neatness*, and *exactitude* in every operation, down to the simplest action, be the student's motto; if he will only act up to it on all occasions he will already have made a great step towards becoming a good chemist. Let there be "a place for everything, and let everything be in its place."

Whenever a piece of apparatus—measure, funnel, dish, &c.—is done with clean it *at once* and put it away. Do not leave a number of things to accumulate to be cleaned all at once, as the sequel to such a system, or want of system, invariably is that something gets broken, or a piece of apparatus is suddenly needed which has to be hunted out of the sink and used dirty as it is, or cleaned in such a manner as to introduce an element of uncertainty in all operations it is used in.

Never leave your balances and weights lying about; but the moment they are finished with wipe them and put them carefully away. See that the balance beams are kept bright and free from rust and the pans well cleaned, and, if of metal, polished on both sides whenever they get at all dull-looking.

Keep your floors free from dust and dirt, and your tables and work benches equally clean.

Always have a clean, dry roller towel hanging in the most convenient place possible, and use it to wipe *water* from your hands or apparatus, but not to wipe *chemicals* or *dirt*.

A plentiful supply of *clear* water is essential; filtered river or spring water will supply most needs. If the taps are supplied from a town main it will be found an excellent plan for breaking the force of the water to slip over the end of the tap a piece of india-rubber tubing, about three inches long, and just wide enough to fit on without much stretching. The bore of this piece being necessarily larger than that of the tap, the stream of water will have its velocity diminished and will flow in a gentle current, under which the most tender negative may be washed with impunity. A further additional precaution may be taken with advantage by putting a piece of fine flannel over the end of the tube. This will filter out that mud and dirt which seems, more or less, to be found in all public companies' mains, and which sometimes gets spouted forth at most inopportune moments. It was my habit at one time to tie the flannel directly to the end of the tube; but I found that in the washing of negatives it got stopped up so quickly as to require constant removal. I now get a piece about five inches square, and, tying a piece of string to each corner, suspend it an inch or two below the end of the tube; it thus forms a sort of bag, which offers its whole surface for filtering, and takes some time to get thoroughly clogged up. It will be desirable to have several taps in the room, so that the washing of negatives may not be interfered with by other operations.

The most prominent objects in a dark room, one may safely say, are the bottles, and I cannot do better than make them the first subject of my remarks. It too frequently happens that the photographer allows his dark-room shelves to get filled with an accumulation of bottles that never get cleaned, moved, or emptied, that are useless, and that are harbourers of dirt of all sorts. The careful operator should never allow this; every bottle should be put away, and its contents emptied when they are of no further use. In a handy corner of the room a supply of plain, ready-gummed labels should be kept, so that any freshly-filled bottle or any experiment in progress may at once have a memorandum put on it to prevent any confusion arising in the future. A want of attention to this precaution has resulted in the spoiling of many an experiment and the waste of many good chemicals. These labels can be bought at a few pence per hundred from any of the label printers in the large towns, or, in default of regular labels, nothing can be better than waste pieces of albumenised paper neatly cut into squares. A pencilled memorandum, a slight moistening with the tongue, and a bottle is provided with a reference which holds good for ever. When intended for bottles in daily use the labels should be written or printed in ink as neatly as possible, and the trouble will be amply repaid by the general appearance of neatness if the labels, when dry, are lightly varnished over with copal varnish, an ounce of which, costing about twopence or threepence, will do some dozens of labels.

The cleaning of the inside of bottles is a very important matter, and one not always performed without the expenditure of some trouble and time. A bottle of small shot should always find a place in a convenient corner near the sink; they are excellent for removing dirt which resists other remedies. A teaspoonful of them and a little fine sand introduced into a bottle with a little water will remove the most refractory deposits. In their absence a few small pieces of brown paper and a little fine dust out of the ashpit, with a little water, will answer very well. Old dried collodion is best removed with a little nitric acid mixed with an equal part of water. A deposit of metallic silver in a bottle that has held a bath will quickly disappear under the same treatment. If the bottle has held toning solution a little hydrochloric acid must be put in, and a little of the dilute nitric acid added to it; the stain will soon give way. If varnish has been allowed to dry on the inside of a bottle, a little methylated spirit put in, spread all over the sides, and allowed to stand in a warm place for some hours, will soften it. It can then be got rid of by the sand and shot treatment.

A bottle that has contained ether, sulphide of potassium, or, indeed, any reagent which is volatile or has volatile constituents, will retain the odour most persistently, even after repeated rinsings with clean water, apparently showing that it is not chemically clean; but if the inside has been made clean by any of the above modes this apparent uncleanness will be at once got rid of by *filling the bottle to the brim* with water. The smell arises from the air being impregnated with the vapour; the filling with water chases all the air out, and on emptying it all smell will have gone. Cleaned bottles should have two final rinsings with distilled water, placed *mouth down* in a warm place, allowed to stand for a day or two, their stoppers put in, and the now chemically-clean and dry bottles stored away for future use. If a bottle be required dry for immediate use it must, after being cleaned as above, be placed before a fire, and either blown into with a pair of bellows or have the air sucked from the inside by means of a long glass tube reaching to the bottom. When made very hot a bottle will appear quite dry; but the moment it is cool the aqueous vapour will again be precipitated upon its sides, and no speedier means than the above of getting rid of it can be devised unless the last rinsing of water be replaced by pure spirit of wine, when the evaporation will be still quicker. This method, however, as it entails some expense, would, of course, only be used in cases where a clean, dry bottle was urgently needed.

The removing of tight stoppers is an operation frequently required. When a stopper will not yield to ordinary pressure the bottle should be placed firmly down upon the table, and, the left hand holding it in its place, the thumb of the right hand should be pressed hard first against one side and then the other of the stopper. This will often loosen it—a little click being heard when it is "unlocked," as it is termed. If no exercise of force will remove it this way the bottle should be firmly held as before, and a series of smart taps on alternate sides given to the stopper with a hard object—a table knife, for instance. If it be still refractory it is most probable that the stopper adheres through the lodgment of something of a sticky nature between it and the neck. What that material is should be ascertained. A little fluid, such as will dissolve it, should be dropped on the neck of the bottle so as to permeate between the stopper and the neck, when, after soaking a little while, it will generally be found that the stopper will give way. If it do not, a final effort to dislodge it may be made by wrapping a piece of stout string once round the neck, holding one end in the left hand while the other is attached to some firm object. If, then, the bottle be rapidly moved backwards and forwards along the string the friction will be so great that the neck will become almost red hot, and it is very rare that a stopper will be found so firmly embedded as to resist all these modes of attack.

Bottles will get broken in the most careful hands. The stoppers should be carefully saved, so that in case of one being lost or broken another may be found to supply its place. If a stopper do not fit properly it may be made to do so by moistening it with water, sprinkling fine sand upon it, and then working with the hand backwards and forwards with a sort of screwing movement—fresh sand and water being added occasionally—till it fit tight, which may be known by no click being made when the stopper is moved about by the fingers. A badly-fitting stopper is worse than none at all, for in the latter case you can see the need for a remedy, while in the former leakage and evaporation take place without your knowing it. Corks should be used sparingly; my advice is—never use them for collodion. It is most rare to get a cork of such a quality that there is not a crack in it, and the slightest inequality gives rise to a quantity of fine dust in the collodion which cannot be got rid of, as it is so light that it floats on the surface. I will conclude this very elementary, yet I hope still useful, chapter by again impressing upon the student the necessity for cleanliness, neatness, and exactitude in his operations.

G. Watmough Webster, F.C.S.

THE PREPARATION OF KENNETT'S SENSITISED GELATINO-PELLICLE.

In the last month of last year we [*ante* page 599, vol. xx.] described an important improvement made by Mr. Kennett, of Maddox Street, in the preparation of sensitised gelatine, which, by the mere addition of water, should be at once converted into an emulsion for coating plates, and which plates, without any further operation in the shape of washing or preserving, should be ready to receive the impression of an image in the camera. Although dry they would compare favourably, as respects sensitiveness, with wet collodion. Though we have at various times referred to Mr. Kennett's invention, and given as full a description of it as lay in our power, we have until the present been unable to give the full details of the method patented. This we now do, the specification having been printed.

The object of the invention is stated to be "the production of a new substance or compound to form an emulsion for photographic purposes, and which, when prepared and sold in a dry or solid condition, will keep in this condition perfectly good for any length of time."

This said improved substance or compound consists essentially of gelatine or gelatinous matter in combination with nitrate of silver and with bromide of potassium, bromide of cadmium, bromide of ammonium, or with the chloride or the iodide of either of these salts in combination with either of the bromides above specified.

In making the said compound the patentee prefers to employ the following materials and process; that is to say, he places in a dish or pan of porcelain or other suitable material about one pound of the substance known as Nelson's gelatine or other suitable gelatinous matter, to which he adds about one hundred ounces of distilled water. This mixture of gelatine and water is allowed to stand for about three hours to soften the gelatine, and is then heated by a hot water bath or otherwise until the gelatine is thoroughly dissolved. He then adds to the mixture or compound about eight and a-quarter ounces of the bromide of potassium dissolved in water, and which must be thoroughly incorporated with the gelatine by stirring. He then incorporates with the said compound, while stirring the same, eleven and a-half ounces of nitrate of silver dissolved in water. The whole of the above operations must be effected while the gelatine is hot. At this stage of the process the said compound or emulsion will contain free bromide of potassium and nitrate of potash, which must be eliminated, and which he eliminates as follows:—He pours the emulsion into glass or porcelain dishes to the depth of about a quarter of an inch, and lets it stand long enough to become cold. He then removes it from the dishes, cuts it in small strips, and washes it with many changes of water, or in running water until the free salts are all dissolved out. He then dries or desiccates the substance or compound to render it capable of preservation for any length of time, and therefore fully accomplish the object of his invention. For this purpose he places the compound or emulsion in flat dishes, which are placed upon hot water boilers or otherwise heated until the said compound is reduced by evaporation to the consistency of a thick paste. Then the said compound or substance is allowed to stand until it becomes cold; it is then removed by stripping it from the said dishes, and is placed in suitable frames in a drying closet, in which a circulation of dry air, either warm or cold, is maintained, whereby the drying or desiccation is completed.

It will be seen from the above description that the proper drying or desiccation of the compound is very essential to the success of the invention; but, says Mr. Kennett—"I wish it understood that I may employ any other suitable and convenient method of effecting the drying or desiccation of the compound instead of that above described. For instance, I may take the said substance or compound after washing the same to dissolve out the free salts and place it at once in the said drying closet, or expose it to an air-blast and thereby effect the drying or desiccation entirely without the application of heat. When dry the said compound is cut into portions of convenient size, and in this condition will be ready for immediate use, or will keep perfectly good for a very long time. It may be conveniently made up into small packets for transmission by post to artists or amateurs in any part of the world. It is unaffected by changes of temperature or climate, and will render the plates to which it is applied highly sensitive, so that good pictures of animals and other moving objects may be easily obtained."

"The whole of the above-described process for the manufacture of my new compound or substance must be conducted in a very weak non-actinic light. The quantity of gelatine used in the said compound may be varied to any desired extent; but the salts must always be in such proportion that there will be a slight excess of the bromide or chloride beyond its equivalent of combination with the nitrate of silver. Before its application to the plates the said compound or substance must be dissolved in warm water, and it should be used in connection with the alkaline developer for dry plates."

The definite or special claim made by Mr. Kennett is—"a substance or compound for forming photographic emulsions which, when prepared in a dry or solid condition, as herein set forth, will remain perfectly good and fit for use for any required time."

Of the merit and convenience of Mr. Kennett's pellicle we have already embraced several opportunities of speaking.

PRACTICAL NOTES ON THE SAVING AND REDUCING OF RESIDUES.

CHAP. II.—ON THE COLLECTION OF RESIDUES.

Having given directions concerning the saving of silver waste (the gold will be treated of hereafter) I may add that it will be found more convenient to keep any chloride that may have been precipitated from old baths by itself, and add it to the chloride from the washing waters at the time it is to be dried, as it will be in a compact mass, and not be diffused through a large quantity of fluid.

I now proceed with its collection and the means of turning it to account. For this purpose the first thing to be done is to reduce it to the smallest possible bulk. To do this the residues from the developing sink and the chloride from the washing waters, &c., should be placed on large filters or on thick flannel strainers to drain, after which they must be thoroughly dried; this may be done by placing the filters in the kitchen oven or on the top of a stove.

The sulphide should be dried in the same manner, but not mixed with the other residues until it is dry. When this is effected the whole should be pounded in a mortar. The paper cuttings, filters, &c., also the films washed from old negatives which contain a large amount of silver, should be burnt. A stove must be selected for this purpose which has not too much draught, as in that case much of the ash may be carried up the chimney and lost. The grate should, of course, be well cleansed from coal ashes and dust before commencing operations; the filter papers will be found to burn with reat fierceness, and should be added from time to time to assist the burning of the less combustible kind of paper. After the whole is consumed it should be allowed to remain in the stove to smoulder; this it will do for some hours, becoming very much reduced in bulk, and being converted into a greyish-brown powder, losing all the appearance of burnt paper. This should now be mixed with the powdered chloride and sulphide, and the whole sifted through a coarse sieve. A shallow box, the bottom of which has been removed and replaced by a piece of perforated zinc, the perforations of which may be about the size of sixteen wire (Birmingham gauge), answers the purpose admirably. This removes many extraneous substances, such as broken glass, pins, tacks, and the thousand-and-one things, including many small articles which have been lost, that find their way into the waste.

It has been frequently recommended to keep the various forms of residues separate; but I do not see any advantage in doing so, as they may all be reduced with the same flux, and will save crucibles.

We have now got residues in the smallest bulk, and their value within two or three per cent. can now be easily ascertained, if it has been *intimately mixed.* To do this, carefully weigh out twenty grains of the powder, and mix it with about the same weight of a mixture of equal parts of the carbonates of soda and potash; place this in a hole made in a piece of charcoal, and submit it to the action of the *reducing* flame of the blowpipe until the silver is reduced to a clean metallic shot. By weighing this the value of the whole may be estimated. It will be better for the tyro to make three assays, and form his estimate from the mean of the three. I have frequently heard photographers say they would not take all this trouble; they always let the refiner do it, as they charge enough for reducing, forgetting that he regulates his charge according to the number of crucibles used and the amount of time and fuel consumed, and not by the amount of metal recovered. It must also be borne in mind that the larger the amount of extraneous matter contained in the residues the more flux and heat are required for their reduction. I need scarcely say that all the pounding and sifting can as well be done on a wet or foggy day by the errand boy, when a little employment may be desirable to keep him out of mischief, as by the photographer himself, when his time is valuable.

From time to time letters have appeared in the journals complaining that the refiner has not made a fair return for the residues. On one occasion a friend complained loudly to me on that subject, and in answer to my inquiry as to his ground of complaint he said that last year he used so many ounces of nitrate of silver, and had received from Mr. A. so much for residues; this year he had consumed more than three times that amount of silver, and he only got so much from Mr. B. From this data only he doubted the honesty of Mr. B. Now, the facts are—that the first year my friend's business was very small, and he did the whole of the work himself; but the second year his business had so increased that he employed a youth, to whose care the saving of residues was, of course, entrusted. I may say that during the last twenty years I have had occasion to send many batches to the refiner, and, with one or, *at most*, two exceptions, I have been well satisfied with the returns made; but I have always taken the precaution of pounding, sifting, and assaying before doing so. When the residues are sent in this way the refiner can at once see that an assay *may* have been made; but when sent as they usually are he knows that this cannot have been the case. Most of the London refiners will allow you to remain and see the operation of reducing performed—a fact of which photographers do not seem to be generally aware.

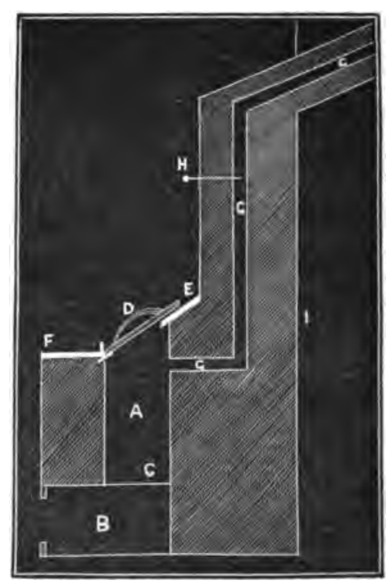
CHAP. III.—ON THE FURNACE.

If, instead of sending or taking the residues to the refiner we decide upon reducing them ourselves, we shall require a large amount of heat, to obtain which we must possess a suitable furnace, and many convenient forms of portable ones are to be purchased which are said to be very effective. Although I have only had a limited experience with them, and then only on a small scale, I feel justified in recommending the photographer who decides on reducing his own residues to have a regular melting furnace built. This is a very simple matter, which can be done in any outhouse by a bricklayer at a small cost, especially if it be built in the proximity of an already-existing chimney into which the flue can be carried.

In the construction of a furnace for our purpose the principal things to be attended to are to confine the heat as much as possible to the crucible to be acted upon, and to produce as much heat as possible from the fuel consumed. Such a furnace should consist of a chamber for containing the fire, with bars at the bottom to allow free access of air and for the ashes to drop through into the ashpit; a flue to carry off the smoke, or, rather, the products of combustion; and an opening, to be closed by a lid, to admit the fuel and crucibles.

Such a furnace is shown in the accompanying diagram (*fig.* 1), in

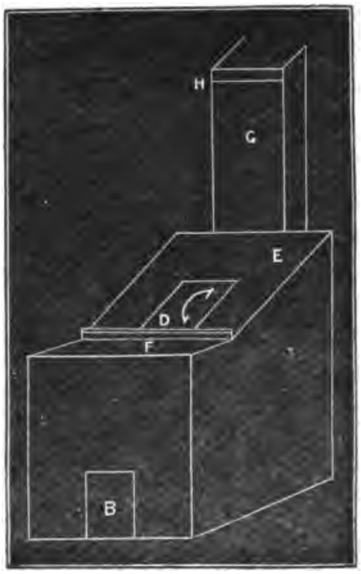
FIG. 1.



which A is the fireplace, B the ashpit, C the furnace bars, D the lid, E the top plate, five-eighths thick, F the flat plate of iron, three-eighths thick, GG the flue, H the damper, and I the wall of the building. *Fig.* 1 shows the furnace in section, *fig.* 2 in external appearance. The same letters and description apply to both figures.

I now describe the mode of construction. Procure from the iron-founders an iron frame and furnace bars; they are kept in stock of various sizes. These should be set in brickwork, leaving an ashpit the same as is done in setting a copper, as shown at C. Then the fire-chamber A, which is nine inches square, should be built up to the height of seventeen or eighteen inches to the flue, which should be two and a-half inches high and four and a-half inches broad (this is the size of the end of a brick). The back part should now be carried up, as shown in the diagram, for the reception of the top plate E, which, for this size of furnace, may be about 18 × 27 inches, with an opening 7½ × 10 inches. This opening, when the plate is fitted in a sloping position, as shown in the diagram, will be about three-quarters of an inch smaller than the fireplace. If this plate cannot be purchased at the iron-founders ready-made a pattern should be made of board of

FIG. 2



the required size and thickness (say five-eighths of an inch), with a strip fastened on half-an-inch from the edge on one of the longest sides to serve as a ledge for the door to slide on, and against the under edge of which the iron plate F fits, making the juncture of the iron and brickwork air-tight. A couple of iron bolts should be passed through this plate, and built in the brickwork to retain it in its place. The flue should be carried back horizontally about twelve or thirteen inches before it goes up straight; and at the height of three feet above the furnace should be fitted a damper, which are kept in stock at the iron warehouses. The inner part of the flue should be very neatly finished, for upon the smoothness of the flue depends much of the freedom of the draught. The inner course of bricks of the fireplace and the lower portion of the flue should be of fire-bricks, which are made of a much more refractory clay than ordinary bricks. These should be selected free from lumps and inequalities of construction; should any small lumps, however, exist they should be removed with a coarse rasp, so that the bricks may fit together as closely as possible, and have very little cement between them. The cement to be used for this purpose is fire clay, which should be made thin enough to be easily pressed out when the bricks are laid. For all the other parts not in contact with the fire ordinary bricks and mortar should be used.

If the flue be carried into another flue the latter should have a damper fitted below the junction, so as to stop the draught in that direction. This may also be used for further regulating the draught of the furnace.

It will be seen from the diagram that when the lid is closed no air can pass up the flue that has not passed through the fire; this is essential when great heat is required.

The fireplace is sometimes made round by placing the bricks on end; but, although the square form may consume a little more fuel, I consider it is preferable to the round, and much more easily constructed.

Some of the closed stoves used for heating the studio may be made to serve on a small scale, especially the "egg stove," which somewhat resembles a furnace in its construction. I have also extemporised a common grate by closing up all the front of the stove and chimney with thin sheet iron. A few inches above the top of the grate a hole was cut six inches square, to allow of feeding the fire and attending to the crucible; this hole and any openings around the edge of the iron was closed with a piece of stout brown paper, the draught being sufficient to keep it in position. Although I say these makeshifts *may* be used, they can only be on a very small scale, and should not be attempted by the novice until he has seen the operation of reducing performed in a properly-constructed furnace.

E. W. Foxlee.

FOREIGN NOTES AND NEWS.

New Method of Producing Pictures in Printers' Ink.—Coagulation of the Albumen Film.—Photographic Progress.—Reduction in the Cost of Metallic Silver.—Adding Turpentine to the Negative Varnish.—Formula for the Preparation of Keeping Albumenised Paper.—Treatment of Plates in Warm Weather.—How to Shorten Exposures.—International Congress of Geographical Science.

A piece of news has been published with much *eclat* by the editor of the *Moniteur* relative to a new method of producing pictures in printers' ink. It is by M. Albert, of Munich, whose "Albertype" process is already very well known. This new one appears to be a modification of that, and its chief excellence is in the rapidity with which prints can be turned out. At present he can only produce fifty or sixty prints a day, but with the new press he will be able to produce five thousand. It is made so that printing can be done on both sides of the paper at the same time, being apparently a machine somewhat similar to the Walter typographical press. The experiments which have been carried through in perfecting it have cost, it is said, 150,000 florins, so that it ought to yield very satisfactory results. The details will be of considerable interest when they reach us.

The subject of coagulation of the albumen film continues to occupy the attention of photographers in France to some extent for several reasons. A road towards permanency appears to lie through confining the image to the surface, and it helps at the same time to economise silver. M. Ed. Quiquercy, in some notes which he has published, contends that alcohol has not much effect in coagulating dried albumen, and that, therefore, its addition to the bath is not of that value which some photographers have supposed. It may do good, but it cannot completely coagulate albumen. The Abbé Laborde recommended, some time ago, in *Cosmos*, floating the paper upon a water bath heated to about boiling point; but this plan tends to give streaky, uneven surfaces. M. Quiquercy is a strong advocate for nitrate of potash in the bath. He thinks it facilitates the formation of chloride of silver in the albumen film, if it do nothing else, by rendering the surface more permeable. He cites Dr. Van Monckhoven's recommendation, as to keeping photographic paper in a slightly-damp place, as confirmatory of the fact that a softening of the film does help the silvering. We should be strongly inclined to doubt this method of reasoning; the authority cited is certainly not very trustworthy upon this point. It is not the habit for photographers of practical experience to place their store of albumenised paper in a damp place. A bath of five per cent. of silver and eight per cent. of potash may possibly give fine prints, as M. Quiquercy says, but the practice is by no means a safe one to follow.

At a recent meeting of the Marseilles Photographic Society the secretary, M. Leon Vidal, gave an account of the actual state of photography to his fellow-members. He glanced at the progress made in recent months, and in doing so dwelt first upon the remarkable researches of Messrs. Sutton, Vogel, M. Carey Lea, and Monckhoven, with a view to render the taking of impressions in the camera easier than they had hitherto been. His praises of what Mr. Sutton has done towards accelerating the rapidity with which the image can be obtained are more than we can venture to translate, and we should fear that that gentleman's modesty of soul might be sorely tempted by words so sugared. Passing onwards, M. Vidal dwelt upon his favourite topic—the progress of mechanical photographic printing, making some interesting observations on the processes of MM. Ducos du Hauron, Roussillon, and soforth, most of which are not new to our readers, and need not, therefore, be repeated. When his somewhat lengthy address was over, one of the members of the society asked him whether prints fixed with a sulphocyanide instead of the hyposulphite of soda were endowed with greater durability than usual—so great, in fact, that they may be said to rival carbon prints. The question surprised the Secretary, for he held it as sensible to ask whether the moon had any chance of giving as much light as the sun. But he proposed a very simple and effective test, viz., to see which sort of print stood best the application of acid. The destructibility of the silver image would be found to be in no degree lessened by the change of fixing mediums.

Photographers will be interested in knowing that metallic silver is now very cheap—absolutely cheaper than it has been for a quarter of a century. According to the last weekly circular of Messrs. Pixley and Abell, the great bullion merchants, the present quotations for standard silver is 57¾d. per ounce, while the average price between 1850 and 1872 has never been less than 60d. In 1869 it was as high as $62\frac{1}{16}$d. The causes which produce such a marked fall in this metal are various; but it is due, perhaps, chiefly to the change of currency which has taken place in Germany, and to the fact that in France paper so monopolises the circulation that there is not the same necessity for new coinage to replace waste. From whatever cause the fact is so, and it is one of considerable importance to the photographer, who, in spite of all the improvements, is still so much dependent upon the old metal.

Considerable differences of opinion appear to prevail abroad as to the value of Herr Joseph Unger's recommendation that turpentine should be added to the negative varnish. In a recent number of the *Photographisches Correspondenz* some sensible remarks upon the cause of cracking have been made by Herr Fitz Haugh. He dwelt particularly upon the bad habit—or, rather, the badness of the habit—of continuing to use cyanide fixing solutions long after it is wise to do so. People keep strengthening them and using them. In his experience an old fixing solution is much more difficult to work out of a collodion film than one that is fresh, and, after all, is more liable to cause the film to crack under the varnish than is the case with new solution. His advice, therefore, is to use the fixing solution always fresh, and thereby much of the dangers to which plates are otherwise subject will be got over. In our opinion the advice is good.

The same photographer gives a formula for preparing keeping albumenised paper, which may be useful to some of our readers. Most of them are familiar now with the usual recipe for producing such paper—the employment of a bath of citric acid, or of citric acid in the bath. His plan is much the same, only that he uses alcohol instead of water — 480 parts of alcohol to ten parts of pulverised citric acid. The paper is not floated upon this bath, but after silvering and drying it is coated over with the solution in a fashion similar to that which used to prevail when photographers printed on plain paper, and used ammonia nitrate of silver. Paper prepared in this way will keep easily for three or four weeks. Herr Haugh says it gives brilliant prints, which tone very well and readily in a bicarbonate of soda and gold toning bath.

A writer in the *Correspondenz* says that he finds it advantageous at times to employ old sensitising bath on his plates in warm weather—baths that he could not use in winter. These he not only uses but acidifies, and, if need be, places during the morning in a pan of ice, in order to prevent tendencies towards fogging. Temperature appears to bother this photographer a good deal, and there can be no doubt that the different behaviours of wet and dry films under its changes are remarkable and worth study. It may be doubted whether photographers generally have as yet realised how much it depends upon the heat or coldness of their chemicals whether their pictures be good or bad. In heat it is certain that developer, collodion, bath, and everything require a certain amount of modulation, and that this is too often neglected; hence foggy pictures and burnt-looking prints which are far from pleasant to the eye.

A correspondent of *Photographisches Archiv*, who has been journeying in France lately, says that the practice of pre-lighting the plate with a view to shorten exposure is considerably in vogue there. He was assured that the practice was attended with the best effect, and that it was possible frequently to shorten exposures by one-half through the system employed. It was very simple, not differing much from those already described through these columns. A circular hole is cut in the middle of the cover of the lens of about two-thirds the diameter of the lens in size, so that a three-inch lens would have a two-inch aperture on its lid. This aperture is filled with an opal glass, and, when the plate is ready, the front slide is drawn up and its surface exposed to the diffused light for a couple of seconds before the cap is withdrawn, and the sitter's image allowed to impinge upon the film. This pre-lighting is said to shorten the exposure by about one-half—a subject which, in an ordinary case, would require twenty-four seconds' exposure, for instance, doing with fourteen.

The International Congress of Geographical Science is to meet next March at Paris. International congresses are the fashion just now, and this one is not likely to be very much more remarkable in many respects than those that have gone before devoted to other subjects. It has, however, a photographic interest of some importance, and the fact that in so many of these societies photography now plays a part is a strong testimony to its growing value as an aid to scientific research. In connection with this meeting there is to be an exhibition devoted to historical geography, micrography, and philology, and to illustrating scenes of distant travel by means of photographs and drawings. The manner in which the camera has penetrated to all lands ought to make a collection of the kind highly interesting.

THE PRODUCTION OF PRINTING SURFACES.

Very numerous are the methods by which, through the agency of photography, a drawing in black and white may be converted into a surface block capable of producing in a typographic printing-press a *facsimile* of the original drawing. Extensive establishments have been already called into existence in the metropolis and elsewhere which entirely depend upon the business created in connection with the commercial use of one or other of the inventions for effecting this end.

The method described in the following article depends mainly upon the fact—known for many years—that a gelatine film which has been impregnated with bichromate of potash is sensitive to light, and that such sensitiveness is displayed by causing those parts which have been acted on by light to become insoluble, while the other portions are soluble in *hot* water, and merely swell when immersed in water of the ordinary temperature. The patent has been obtained by Mr. Banks, of Battersea, and the process is about to be extensively utilised. We do not at present offer any remark as to the novelty of the various claims; but we imagine that many of our readers will be able to point to pages in former volumes of this Journal in which similar processes have been published. At anyrate we have numerous specimens of phototypography in our possession which have been executed by processes *substantially* the same as that of Mr. Banks, whose process we now describe in the patentee's own language:—

The object of my invention is mainly to produce from a drawing upon paper or a letterpress, copperplate, or lithographic print or drawing a raised surface block applicable for typo-printing, or a plate similar to an engraved copper or steel plate applicable for printing by the ordinary copperplate or lithographic press. The raised surface plates can be produced either flat or they may be cylindrical for the purpose of printing upon calico and such like purposes; metal dies to be used as seals, or for stamping paper and such like uses, or to be used as embossing plates for bookbinders for stamping or embossing book covers or leather, or other substances in high relief, or for other purposes connected with the printing, bookbinding, die-sinking, or embossing trades where printing or embossing is used.

To produce the above results, either from a drawing, letterpress print, photograph, or any work of art on paper or painting, I first obtain a photographic negative in the ordinary way by means of a rectilinear lens and ordinary camera upon glass (No. 1), except that I lastly develope it with a solution of bichloride of mercury, wash this off with cold water, and then put iodide of potassium, wash this off with cold water, and then put hydrosulphuret of ammonia, say one drachm to two ounces of water, for the purpose of making all the white parts in the print or drawing as opaque and black as possible on the glass, so that the sun or artificial light used in printing the design upon the prepared glass No. 2 (which I hereafter describe) shall not act upon the white parts, but only on the drawing. I afterwards prepare a glass No. 2, by laying it perfectly flat, and according to the quality of the lines or work on the design so I make the thickness or thinness of the film of gelatine, or chondrine, which I prepare as follows:—I take two ounces of gelatine, chondrine, best Russian or French glue made from the pates of the buffalo or from parchment cuttings, cut it into small shreds, and then pour upon it one pint and a-half of cold water and let it stand until it is dissolved, say about ten hours, and then gently make it hot, not to boil nor burn, and after laying the glass flat I pour on the glass, if 12 × 10 inches, three ounces, and then leave it to dry; after it is dry I then make up in a bath a solution composed of one ounce of bichromate of potash, or other bichromate or peroxide of chromium, to one quart of cold water, with about half-a-drachm of hydrate of lime. I then place the glass containing the dried gelatine film upon it in the bath, taking care that the mixture covers it entirely, and when it has remained in three or four minutes I take the glass out and put it on its end to drain and dry, taking care that no daylight enters the room—only gas or dark yellow light.

When this prepared glass No. 2 is perfectly dry and the film hard I take an ordinary pressure-frame, with a plate glass front, and on the plate glass I lay the photographic negative glass No. 1, with the silvered side upwards, and upon this side I place the film side of the glass No. 2 upon it, and then I place a piece of black velvet upon the back of glass No. 2, press the whole tightly together, and expose the glass to the sun's rays, or to a magnesium, electro-magnetic, or other white light for about five, ten, or twenty minutes, and then I obtain a printed impression; that is, the design upon the negative glass being transparent and the white parts being black. The sun or other light can only go through the transparent parts, and so converts the printed portion of the gelatine into an almost insoluble compound, leaving the white portions perfectly soluble; I then take it into the darkened room, having prepared a bath composed of hot water two quarts, mixed with chloride of sodium one ounce, and by brushing the gelatine with a brush all the white portions wash away, and the design is left on the glass standing up untouched. I then immerse it for five minutes in a bath composed of acetic acid one ounce and cold water one quart, for the purpose of hardening it, and afterwards take from it a plaster cast, from which a second plaster cast can be taken and printing surfaces be prepared from it, as hereinafter described.

The mode, however, which I prefer is, instead of using hot water, to use cold water one quart, mixed with ten grains of iodine or sixteen grains of iodide of potassium from a quarter to half an hour; then take it out and put it into a bath of cold water, two quarts mixed with twenty drops of ammonia, for about a quarter of an hour; then take it out and place it in a bath of two quarts of cold water mixed with one ounce of acetic acid for about five or ten minutes to harden the edges of the design that have not been raised up. By this means I obtain a gelatine surface mounted on glass, and having the white portions of the drawing raised up to a very great height, quite as high as any wood engraving is cut in depth, and the drawing is level and sunk; the gelatine surface has also been strengthened and toughened so that a cast can afterwards be readily taken from it, whereas heretofore the casts taken from gelatine plates have been very imperfect. I then mix some plaster of Paris or cement, and take a cast which gives the design raised up and the white portions indented similar to wood engraving. Should any of the white portions not be sufficiently deep I then proceed to deepen them. One method I have is to roll over the raised portions of the plaster cast a mixture of printing ink and copal, or some one of the varnishes now in use commercially, and when dry I dip the plaster mould into a bath of very weak soap one part and cold water five hundred parts, and brush away with a soft brush the unprotected plaster, and afterwards I harden the plaster with weak alum and pyrogallic acid and water until the air-bubbles cease to rise from it. Another way I have is to cut away with a gouge all the whites that are not sufficiently deep; but if I require to take a casting in plaster of Paris for stereotyping purposes I do not use the soap water, but harden it by immersing it in a bath of hot size, a little treacle, and peroxide of chromium, until the air-bubbles cease to rise from it, and then expose it to light, and, while wet, I lay a frame upon it, pour in the plaster of Paris, and just before it sets I put it under pressure, and the loose water being pressed out gives a much sharper casting.

If an electrotype is required instead of a stereotype casting I then take the plaster cast that has been taken from the gelatine film and soak it in cold water until bubbles cease to rise from it; I then make the face of the plaster hot by placing it over a gas flame, and put a frame on the face and pour on it a preparation of hot wax mixed with resin and lard, which mode I prefer, and thus take an impression in wax from the plaster mould. I afterwards polish this wax impression in the usual way with blacklead, or coat it with metal by using mercury. By washing the mould with spirits of wine and, when nearly dry, allowing the fumes of mercury to settle on the face, I get a metallic covering which readily receives a surface of copper without being brushed, whereby the fine lines are kept intact.

To produce a copper plate similar to a copperplate engraving I take a negative with the lights and shades reversed, by adopting the same portion of the process of glass 1 and 2 which relates to the printed representation on glass No. 2, and raising the surface with acetic acid only; I then take a plaster mould, and by taking an electroplate I produce a copper plate as thick as an ordinary engraved copper plate with the drawing indented exactly similar to an engraved plate which can be printed by the ordinary copperplate press. For some work I modify the mode by not taking a negative; but, by placing the print in contact on glass No. 2, it acts as the negative, and after it is reproduced on glass No. 2, and proceeding as already described, a plate is produced which can be printed from in the ordinary manner.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that I claim as my improvements in the production of printing surfaces and of engraved metal surfaces applicable for other purposes—

1. The combined process substantially as herein described for the production of raised surfaces applicable for typo-printing and other uses.

2. The combined process substantially as herein described for the production of engraved plates applicable for copperplate printing and other uses.

3. The use of a bath of bichromate of potash or other bichromate or peroxide of chromium with hydrate of lime added to it for sensitising the gelatine plates. I also claim taking a cast from the plate, as herein described, without removing the gelatine from the glass.

4. The toughening of the raised gelatine surfaces by the means substantially as described.

5. The preparation of the plaster casts by the means substantially as described prior to taking a second cast or wax impression from them.

6. The pressing of the plaster just at the time of setting when taking plaster casts from gelatine plates or casts taken from them, as herein described.

7. Imparting a thin film of mercury to the surface of the gelatine plates, plaster casts, or wax impressions, by the means herein described to prepare them for electrotyping.

JOHN HENRY BANKS.

A FEW MORE REMARKS ABOUT PRINTING.*

TONING BATHS.

Of all parts of photographic printing this is undoubtedly the most important and difficult, with the exception, perhaps, of the printing bath. There are a great variety of toning baths in use, a great proportion of which are excellent for certain cases. I shall here give my own humble thoughts or ideas on the making and care of the different toning baths, with such quotations as may be found necessary from others probably far more skilled in this branch than the author may be.

Before proceeding further, I will explain to the beginner the reason why there is such a bath, called the "toning bath," used. The prints, as they were left in the last chapter, need some agent to remove the silver left in them, else they would continue to darken upon exposure to the light, and in a short time be so dark as to be indistinguishable. This agent is known by the name of "hyposulphite of sodium." If we were to place the prints as they are now directly in the soda solution they would turn a dirty yellow colour, to get rid of which, and give a more pleasing one, a bath, called, as before said, the "toning bath," is made. Hence, then, the object of the toning bath is partly to give permanence, but principally to give the colour or tone to the prints; and in this colour we may expect to find brilliancy and beauty according as to how the prints were treated while in the bath, as will be shown in the next chapter.

In the first place, good chloride of gold is necessary in the making of these toning baths, and to those persons who do not wish to make their chloride of gold for themselves, among whom the young beginner should certainly be classed, I would advise them to purchase a stock from some reliable stockdealer. Each bottle contains fifteen grains, which may be dissolved in a bottle containing fifteen ounces of pure filtered rain or distilled water. Label this bottle, "stock gold solution, one grain to the ounce of water." This solution will be slightly acid, which it should be to prevent the light from precipitating the gold. Keep this bottle in the dark, or at least out of the brightest diffused light.

Acetate of Soda Bath, as made and recommended by Mr. George Hooper, in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1873, I will here give, judging it to be excellent. He gives preference to the bath made as described below, for the following reasons, viz.:—

"1. For the beauty and permanency of its tones.—2. For simplicity of formula.—3. For its great economy.—4. For its certainty and regularity."

The bath is made as follows:—

"Always keep in stock the following solution:—Solution No. 1. Dissolve a quarter of a drachm of chloride of gold in fifteen ounces of water.—Solution No. 2. Dissolve a quarter of a pound of acetate of soda in forty-eight ounces of water. To make the bath, take of—

Water	30 ounces.
Then add	
Solution No. 1.	3 ounces.
And next add	
Solution No. 2.	3 ounces.

"Let stand a whole week before using; if wanted sooner make it with hot water. This bath will tone day after day until at least four sheets have been toned, and when apparently exhausted throw away say six or ten ounces of it, and add a similar quantity of fresh bath made according to the same formula, taking care its age is not less than one week, as the acetate bath goes on improving; if used too new would tone unevenly, and the prints would lack that brilliancy so easily obtained when the bath is of the proper age. Always take the prints out when of a purplish-brown, but never at the rusty-brown stage. If the washing has been carefully done you will find that nearly all of the batch will be finished about the same time—vignetted portraits first and then the plain portrait, which latter always take up a larger proportion of gold. When the toning is finished pour your bath back into the jug or bottle, and keep the same for next time. Should there be a slight deposit of chloride at the bottom decant carefully so as not to disturb it; this will save all filterings, which are always better avoided."

Sal Soda Toning Bath.

Distilled or melted ice water	64 ounces.
Acid sol. chloride of gold (4 grs. to the ounce)	1 ounce.
Saturated solution sal soda	4 ,,

The bath feels quite slippery to the fingers. Make it a full half hour before you wish to use it, and during the cold weather make it with the water slightly warm. Make it every night and save the old solution, and throw down the gold with protosulphate of iron.

This bath bleaches a little more than baths generally do, and so the prints should be printed quite dark. The prints when first placed in this bath will turn quite red after a minute or two, and after they have discontinued turning red watch them closely, for they will now very soon commence to tone, so that you will readily notice it, and when they have once commenced to border on the tone you desire they will very quickly arrive at the proper stage.

In toning disregard the shadows, but watch the high lights and half-tones of the face, and when they just commence to look purplish and the red look has disappeared they are toned, and should be immediately removed to a dish of running water. The hair, draperies, &c., may not look to be toned, but they are. When you are fixing these prints they will turn a variety of colours before they turn the right one, and when they turn that colour to which you toned them you may be sure they are fixed.

* Continued from page 452.

Chloride of Lime Bath.—With this bath pure whites and fine blacks can be obtained—such effects as are suitable for architectural drawings, pencil sketches, &c. It should be made forty-eight hours before use, and when about to use it add a little of the gold solution, also a little of the chloride of lime. There is considerable fault found with this, both on account of the uncertainty of its composition and also with the various results obtained with it.

That is owing to the photographer's using what is called the saturated solution of the chloride of lime, when in many cases the solution is far short of being saturated. When you commence to make a saturated solution of this chloride of lime, and have placed nearly two ounces of the chloride in about twenty-five ounces of water, there will be a precipitate in the bottle which will make you think that the solution is saturated, since it will not dissolve upon repeated shaking of the contents; but this is simply a part of its compound (the hydrate of lime), and you can still add more of the chloride of lime to the solution before it is saturated, as this chloride is separated and dissolved, whereas another part of its composition is not, for the beginner must bear in mind that the so-called chloride of lime is a compound.

The apprentice thus sees why he is often in difficulty in using this bath, and to obviate it I recommend that instead of using a saturated solution he accustom himself to weigh the chloride of lime, and then he can, after he has once started rightly, keep it always the same. This bath can be used a number of times, by decanting the clear liquid out of the bottle and adding gold enough to tone the prints and a trifle of lime. It is made as follows:—

Water	40 ounces.
Chloride of lime	5 grains.
Chloride of gold	4 ,,

The chloride of gold may be made in strength at about one grain to the ounce of water, and may be neutralised with carbonate of lime, if it is acid. If the chloride of lime bath is made as above I do not think that there will be any difficulty in working it.

Citric Acid Toning Bath.—This is a most excellent bath, either for portraits or landscapes, there being in its composition no strong alkalies or acids that will be apt to hurt the albumen on the prints a particle. I used this bath two years, and it is a most worthy one. Here it is:—

Solution No. 1.

Citric acid	1 ounce.
Water	20 ounces.

Solution No. 2.

Chloride of gold	15 grains.
Water	15 ounces.

Stock Solution.

Now take of solution No. 1 two and a-half ounces; make slightly alkaline with saturated solution of bicarbonate of soda two and a-half ounces, or about that. Solution No. 2 half an-ounce; water, sixty-four ounces. When ready to tone take sufficient of the "stock solution" (which should never be less than three or four days old) and add thereto one ounce of gold solution No. 2, and make this fresh solution which you are about to add to the bath a little alkaline with bicarbonate of soda.

A better way, however, for the beginner to add this fresh gold to the bath, instead of pouring the gold immediately into the bath, is to pour it first into a clean graduate and there make it alkaline. Pour some of the toning solution (stock) into the graduate and thoroughly stir with a glass rod; then add the whole to the rest of the bath which is in the dish, and stir well again. To every four sheets of paper you tone add about an ounce of gold solution, adding, however, at different stages of the toning operations and not all at one time, as that would make the first few batches of prints tone too rapidly. Do not add any gold while there are any prints in the bath, stir well, and allow the bath to stand without being used for about three or four minutes after you add the gold. I recommend the above cure to beginners, because they often obtain uneven tones by the abuse of the advice given above. Do not tone in a too strong light but in rather a weak one, and judge not the tones of the prints while in the hand, but while lying down in the dish. Tone exactly as you wish them when dried, and no more nor less. Wash the prints constantly in running water after toning. Fix as usual.

Bicarbonate of Soda Bath.—This is probably one of the best of baths, and I have seen some of the very best of tones obtained with it. It is argued by some that the simpler a bath is the better, that it is only chloride of gold in the toning bath that tones, that all other ingredients that are placed in the bath are useless, and this bath is just what these photographers advise, since there is nothing else to be placed in it. Here it is:—

Chloride of gold solution (one grain to the ounce of water)	1 ounce.
Water	16 ounces.
Bicarbonate of soda (saturated solution)	10 minims.

Make it half an hour before use, so as to allow it to ripen thoroughly. Make it of lukewarm water. This bath cannot be kept, and needs to be made up fresh every time you prepare to tone. Throw down the gold in the old bath with protosulphate of iron. It is ready for toning when it has commenced to discolour slightly. I have one more bath to give and then I am done, and I have reserved this one for the last not because I think it the least important, but because I think it the best of the whole lot, for I do not think that there is a bath besides this one that works so prettily during toning, and which gives such magnificent tones. It has the following merits:—

1. It is simple in construction, and not apt to be changeable.
2. The most beautiful tones can be obtained with it.
3. The alkali used in it is not used in such abundance as to hurt the albumen a particle.
4. It will tone a weak and flat print the best of any bath that I have ever used.

The most beautiful tones are attainable with it, the high lights and half-tints of the face being very clear and cool in the more retiring shades, while in the hair, deep shadows, and draperies, especially the darkest, there will be a very rich, warm colour. There is always a very delicate velvety look to the prints when properly toned, which is very much admired, being difficult to obtain with some baths. It is made as follows:—

Chloride of gold	2 grains.
Pure rain water	24 ounces.

Make the solution slightly alkaline with—

Saturated solution sal soda, about	6 to 8 minims.
Chloride of sodium (table salt), in weight	½ to 1 ounce.

In making this bath I first place the quantity of gold solution I am going to use in the dish at one corner, and in it place a piece of blue litmus paper, which will immediately turn red. Now take the bottle of sal soda, and drop into the solution in the dish until the litmus paper turns a decided blue, which will take about six or eight drops. Then place your water in the dish, and last of all your salt. Stir up the contents well and let stand from five to ten minutes, and it is ready for use. The bath should be made up as per formula every night, throwing down the gold in the old solution with protosulphate of iron. In toning with this, or in fact with any of the above baths, should it become exhausted add the ingredients used in the first place in exactly the same proportion as was used in the making of it at first.

One of the greatest mistakes made in toning by some toners is in toning the prints until the draperies, &c., are about the right shade, thus disregarding the face, which is the principal attraction of the prints, and to the toner it should always be the object of attention. With the toning bath just described I will here give the mode of working, which, if followed out, will be productive of excellent results.

This toning should be done in a quite weak and even light, and at a little distance from the window. An idea of the quantity of light required may be had by bearing in mind that all you wish is to see distinctly and clearly, without any guessing.

Take a couple dozen of prints, and let them lie in your bath solution face up, but constantly under the surface, and keep them in motion while in it. At first the prints will not perceptibly change, but within the course of two minutes or so the high lights and half-tints of the face will lose their red tint, and will commence to border on the rich purple, and then they will very quickly arrive at that stage when they are to be removed to a bath of running water. The stage at which the toning is to be discontinued is perhaps at first a little difficult to determine; you should tone a batch and let your assistant fix them, and when they are fixed, not before, you should judge of the tone.

Never take your prints up in your hands to examine them, for you will surely then be deceived, and take them to be under-toned, when by examining them while lying in the dish they will appear to be toned sufficiently. The prints are toned when the high lights and half-tints of the face appear clear and a little blue when they are lying down in the dish and examined in a weak light.

Take them out immediately, even if upon looking at them in a stronger light the shadows and draperies should appear as red as fire, for the prints are toned. In nine cases out of ten you will at first over-tone the prints rather than under-tone them. Tone for the lights and half-tints, and let the shadows take care of themselves. The salt in the above bath is the improvement of this bath over the common sal soda bath, and it is partly owing to this salt that such beautiful tones can be obtained. In case you over-tone the tone will never be a disagreeable slaty one, but rather a pretty blue.

PHOTOGRAPHIC ADVENTURES IN COLORADO.*

After working our way to the top of the cañon—a waggon road all the way—we reached Middle Boulder. It will give you some idea of the cañon when I tell you that the road crosses the stream fifty-two times in twenty-five miles, "the stream a roaring mountain torrent all the way." At Middle Boulder we visited the mill for treating silver ore belonging to the famous Carrison mine. The mine and the mill were sold a year ago for $3,000,000 to a Dutch company, and is thought a bargain by experts. The ore is not a high-grade ore, but the company's arrangements are first-rate, and they take out piles of silver. There are many better mines would be sold for $300 if one could be sure of them. While I write of mining I will mention a thing which occurred today. Professor Hill sent over to a mine of high standing (a gold one), and

* Continued from page 451.

asked the owner to send him some specimens for his friends. The mine-owner said the price would be the assay value. There were thirty pounds of it, and, to the Professor's horror, the price was over $3,000 for the lot. Of course this is a rare case, but the same man has 500 pounds of the same stuff. Some mines pay splendidly, while others do not pay at all; but they all make a living for their owners apparently. Lead mines carrying from fifty to one hundred ounces to the ton of silver are hardly looked at, as there are no works for lead ores. I photographed over one ton of pure silver down at Hill's works the other day. I get all my silver from him, and find I can make it cheaper by forty cents per ounce than I can buy it in New York.

Our course had up to this time been west. Now, after leaving the cañon, we turned north, and our ambition was to travel north until we came to the "Caha La Pandire" river, about 200 miles. We were now some eight or ten miles from the main range of the Rocky Mountains, "rising, a broken, serrated wall," from 12,000 to 14,000 feet above the sea level. Our course ran generally from 8,000 to 9,000 feet, for we had an aneroid and took notes. After leaving Middle Boulder our road ended, and our mode of marching was this:—My companion rode ahead and picked the road, and the donkeys, knowing their duty, followed steadily in Indian file. The mule, true to his kind, rubbed up against all the trees, trying to get off his pack. The only cure was to get a rope round his lower jaw, and wind the other end round my companion's saddle pommel. We frequently had to get off and cut our way through the underwood with hatchets. Cotton-wood, a species of poplar, grows in all the moist places. We often came to a dead halt; some deep cañon or roaring mountain stream headed us off, and compelled us to retrace our steps. Our course was serpentine, so we often had to travel twenty miles for six or seven straight ahead, and happy were we when we met with an old Indian trail, or, indeed, the trail of anything whatever.

After striking north our first camp was by the side of a small lake. Here we saw some curious four-legged fishes, and tried to catch some to look at, but they were too quick for us. Next morning, while looking for a better article than this, I saw a large water-snake bringing one ashore, so I killed him, and, after examining our four-legged fish, I put him in the water, and he went away as if nothing had happened. These fish belong to some of the alleged long-extinct tribes, having legs, lungs, "no gills," and skin, but no scales. Saurians, I think, is the class they belong to. But I am a fish ashore on this question, so will quit it. After wandering some four days in this direction through a wild country, but with plenty of grass and water, we reached the St. Vrauns, "the north fork," and in the afternoon resolved to camp on its bank. All this time we had not seen any game except two mountain grouse about the size of a common chicken, which we shot, for we were anxious to save our provisions as much as possible; and although we could hear the roar of the bear and mountain lion—a species of huge panther, often measuring from ten to twelve feet from tip to tip—nearly all night, making Young America creep into his shell, yet we never could get a sight of them in the daytime.

Well, on the bank of the river we, of course, wanted to cross first. We found an old beaver dam of immense extent, with grass so high that our donkeys disappeared, packs and all; in fact, we lost one of them in crossing, and had to track him before we found him. I could frequently notice the grass parting on the pommel of my saddle. Having crossed the river, it being too late for photographing, we put things in shape for the night, and went fishing. After catching a few trout we returned to camp and lighted our fire, and were preparing supper when a voice on the other side of the beaver dam hailed us—"How the d——l am I to get across?" By this time it was quite dark. We told the owner of the voice the best way we could. After a little time two men well mounted, bespattered with mud, and armed to the teeth, scrambled up the bank. We at once recognised the sheriff of Boulder, who gave us the signal to keep quiet, and, after chatting a little and telling us in the presence of Young America that he and his companion had got lost, and seeing our camp fire they had come in, he called us aside and told us that he had a warrant for the arrest of "Young America" in bulk. It appeared that one of the trio had stolen $1,000 from his father in New York, and had taken his companions out for a trip in the west. So we agreed to keep quiet, and let them have another night's rest.

The Sheriff and his assistant had tracked us for two days, and, being out of provisions, were nearly famished. We provided for them as well as possible, and they slept with their feet to the fire, without any blanket. Next morning there was wailing in camp when our visitors proceeded to disarm "Young America," and state the case. Well, we packed them off as quietly as possible. All the pluck was taken out of them, and we foresaw that they would submit to their fate quietly. So they were sent east, and thus ends their history so far as I am concerned.

I felt the matter bitterly, but my companion seemed to take it as a matter of course. After taking a couple of pictures we moved, and, after a weary day's travel, we camped in a very lonely spot; camping ground must have always at hand wood, water, and grass. Next day brought us to a beautiful little lake north-east of Long's Peak, the Peak being distant about eight miles. The lake was covered with water-lilies, and we named it "Lily Lake." This was on Saturday evening, so we made up our minds to lie over for Sunday. About the middle of the night I was awakened by the cry of the mountain lion quite near and the growling of my dog. It being quite dark we had, of course, to let the lion alone, knowing that they never attack a camp so long as they can get away comfortably. Next morning it was too windy to take pictures, so I went in search of our visitor; I found his tracks as he had come down the mountain to drink, but I could not see him. After searching a couple of hours I returned. I got on my way back a bird I had not seen before, somewhat like a small turkey. It made a splendid Sunday dinner, and even two hungry fellows, backed by the day, could scarcely demolish him.

I got some pictures of Long's Peak in the afternoon, and next forenoon we started on our journey. We then descended rapidly for a few miles, when we reached Estes Park. Every place in the mountain that is at all leaved is called a park, which is very appropriate, being surrounded with steep mountains. Here we camped on the borders of a lake where I thought I might get a view. You see that here you not only have got to take views but to discover them also. Well, we camped under a rock, and sadly annoyed a colony of swallows that had taken up their abode there. Next morning a man came into camp and told us that a party was camped in another part of the peak a few miles off—a party hunting and fishing. Here I tried a plate, using the lake water, but found I could not get a clean plate. After considerable search I found a spring about a mile off, and got some plates. In the evening the morning visitor returned with a present of trout, which we enjoyed, and invited us to come and camp alongside. So we moved down, and found three tents, tables, waggons, &c.

After we had settled down, having put up our tent to be like the rest—for we never did so unless it rained—a man came running into the camp saying that coming up the park was a waggon containing *ladies!* Ah! then there was hurrying to and fro; needles and thread! needles and thread! Everybody had some important part of their "breeks" to mend, and no time to do it. Now American "shoddy" does not stand much riding through the bush, and they were a pitiable sight to be sure. I, gloved in a pair or two of old country breeks, cared less. Our camp was soon a lively scene. They were much amused at our outfit. We had invitations out to dinner *(sic)*, &c.; always plenty of trout, but no game—everything having been scared away. I got several views for marching a mile or two, always taking a donkey to carry things. Our friends, who discovered that I had half-a-gallon of alcohol aboard, were very apt to take a pain in their bowels in the evening, so I had to lay an embargo on it, unless in case of something serious. One of the company who said he wanted to get out of the beaten paths, proposed to accompany us; he was a Congregational minister from Illinois, so we took him along. He had a good horse and plenty of outfit; his name was Mr. Savage—and a really jolly companion he turned out to be. Here we learned that the Indian outbreak had been "squashed." Had it come to anything serious we should have headed in another direction. I see in the papers that they are on the "war path" just now, murdering and stealing, as usual, in that quarter.

(To be concluded in our next.)

Correspondence.

MR. DUNMORE ON ACIDIFIED DEVELOPERS.

To the EDITORS.

GENTLEMEN,—In your issue of this week Mr. Dunmore advocates the use of acid in large quantities as an ingredient of developers, and commends to the adoption of photographers an opinion based upon certain of his experiences which are not detailed, and certain of his comparative experiments which are not described. He speaks, with much approval, of a preparation he employs containing colloidal substances he does not name—in quantities he does not give. His negatives appear to be, at any rate, approved of by himself, and their good qualities are attributed to the largeness of the dose of acid used, whilst there is no *evidence* to show the part the colloids play. If the developer Mr. Dunmore uses is of secret preparation he should not sound its praises in your columns; if not, he should describe its composition when he enumerates its properties. Experimentalists who give results without the data for their reproduction place themselves, in consequence, as much beyond reliance when they happen to be right as they do beyond correction when they happen to be wrong.—I am, yours, &c.,

The Doctor's Cottage, Blackpool, D. WINSTANLEY.
September 19, 1874.

PHOTO-RELIEF MOULDS.

To the EDITORS.

GENTLEMEN,—Permit me to add a few words by way of contribution to the interesting discussion now going on in your pages by Messrs. Woodbury, Batho, and others on the subject of casts for printing surfaces from gelatine relief moulds.

Early in 1867, having been recommended to try the effect of a soft tinfoil as a means of obtaining a surface which should be both sharp and a conductor, I adopted the following means:—I first of all bent a sheet of the foil round one edge of the glass, and pasted it on the back so as to secure the sheet against shifting, although I afterwards found that this was not really required. I then laid the sheet smoothly over the face of the gelatine relief, and pressed it into intimate contact by means of a hair dabber, in shape something akin to a shaving brush, completing this dabbing operation by means of a piece of coarse velvet, or rather plush, wrapped round my finger.

When, by these means, the greatest possible sharpness had been obtained I next applied a solution of gutta-percha in bisulphide of carbon, pouring it on as one would apply collodion to a glass plate. After this had become dry I superposed a sheet of gutta-perch previously rendered slightly soft by means of heat, and then submitted the whole to such a degree of pressure in a copying-press as to force the thick sheet of gutta-percha into close contact with the thin film which covered the tinfoil. The amount of pressure applied had, of course, to be regulated so as to avoid breaking the glass, which will never occur if the bed of the press be quite flat.

I can strongly recommend this as an excellent method by which to obtain surfaces that shall be both sharp and conducting.

The method here described is nearly the same, although it differs in some slight details, as a method patented by Mr. Duncan C. Dallas in 1866. The object he had in view, however, was different from that of Mr. Woodbury; hence the one patent does not trench upon the other.—I am, yours, &c., X. Y. Z.

September 22, 1874.

EXCHANGE COLUMN.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, from September 11, 1872, to the present date (one missing), for a good stereoscope and slides.—Address, W. U., 19, Derby-street, Beverley-road, Hull.

I will exchange a good rolling-press for pictures 24 × 28 for a portrait lens and camera for pictures 12 × 10 inches, difference in value being adjusted.—Address, INFALLIBLE BURNISHING MACHINE Co., 89, High Street, Worcester.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

J. J. Rishton, Haslingden.—*Two Portraits of J. E. Warburton.*

W. Usherwood, Dorking.—*View of the Charta House, Godalmine.*

Henry Dunmore, Wicklow.—*View of Roman Catholic Chapel, Wicklow.*

G. and J. Hall, Wakefield.—*Three Portraits of E. A. Leatham, Esq., M.P.*

Eliza Devine, Edinburgh.—*Photograph from Original Painting from "Ulalume."*

H. Sampson, Southport.—*View of Tables set for Banquet at Opening of the Aquarium, Southport.*

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

GRACCHUS.—We regret being unable to comply with your request.

T. JAMIESON.—Two persons bear the same name; hence the mistake.

THOS. H. M'COLLIN (Philadelphia).—Received. In our next. Thanks for your kind and prompt attention.

PYRO.—Sheet gelatine may be obtained at the artists' colour shops and at fancy stationers'. Crystallised honey may be obtained at Italian warehouses.

PHO—TOG.—The camera was patented by M. Silvy in 1867, and the specification may still be obtained. We published this specification at page 315 in our volume for 1868.

VERDANT GREEN.—If the sample of gold be really neutral, bordering on alkalinity (a contradiction in terms), there exists no necessity for adding the alkaline carbonate.

W. PROSSER.—Float the paper for the usual time, let it dry thoroughly, and then expose it to ammoniacal vapours for ten minutes. We recommend the acetate toning bath.

PHOTOLITHO.—The photolithographic process of Mr. J. W. Osborne was communicated to a society in Melbourne in 1859. It was patented in Australia in the course of the same year.

AU. CL₃.—The cause of non-success is to be found in your washing the prints too thoroughly before placing them in the toning bath. Rinse them only slightly, and you will not fail to obtain the desired result.

GEORGE BROWN.—This correspondent encloses a print from a dry plate prepared in 1866, and exposed and developed about four weeks ago. It was prepared with tannin. Judging from the print the negative is very fine.

F. J. PATTERSON.—Your new dark slide will be a very suitable object for exhibiting at the technical meeting of the South London Photographic Society, and we shall have much pleasure in taking charge of it for that purpose.

COLLODIO-BROMIDE (Blackburn).—If you try Captain Fox's modification of Mr. Bolton's process, described during the present year, you will have no cause to complain of a want of intensity, while the sensitiveness obtained is very fair.

J. B.—It is not possible—at least in London—to construct for £5 a glass house which would answer your purpose. We have submitted your letter to a carpenter, who states that the erection of such a house as that required would cost not less than £20.

S. S.—Although by the means proposed you can obtain two pictures which may be so well joined as to defy detection, still the combined picture will not be correct; for while, *as a whole*, it will be panoramic, it will be composed of two pictures in plane perspective.

T. & A.—If you were only employed to take the transparency your customer has no more right to the negative than he would have were a paper print ordered. The custom of the trade is not to give up the negative unless a special arrangement to that effect has been made.

PHOTOLITHO.—In reply to your question we may state that we are perfectly familiar with the details of both photolithography and the production of printing blocks by means of photography, having made numerous lithographic transfers and raised printing surfaces by means of photography.

TOURIST.—It is now rather too late in the season, otherwise we should have advised you to obtain a tourist's monthly ticket, the holder of which possesses the privilege of breaking the journey, at most of the places mentioned, for a time sufficient to permit the photographing of the various objects of interest.

R.—This correspondent inquires if we can recommend any specific means by which he can secure royal patronage! We imagine, however, that *many* photographers would desire to obtain royal patronage; and we have no doubt that a considerable number would have no special objection to a larger share of public patronage.

P. Q. (Dysart).—It is evident from your description that either the lens does not work to focus—which, from the high reputation of its maker, is extremely improbable—or the surface of the ground glass does not correspond accurately with that of the sensitive plate. First ascertain this by very careful measurement, and then write to us again.

MEDICUS.—1. We do not understand your communication sufficiently to be able to answer it, because, on referring to the catalogues of two of the makers mentioned, we find that you have so mixed up the back focus and equivalent focus measurements as to render it impossible to distinguish between the real powers of the lenses employed in the experiment.—2. The scratch will not do any harm if you paint it over neatly with black varnish. Do not attempt to have it polished out, or you will run great risk of spoiling the lens.

JUVENAL.—We are unaware whether or not the following mode be the *best* that is known for the preparation of ox-gall for artistic purposes, but it certainly is a good method, and has been used by us for several years:—In a clean saucepan place a pint of fresh ox-gall, and add two ounces each of common salt and powdered alum. Place it over a fire, letting it remain there till it boils, after which remove it for half-an-hour to cool. Repeat the boiling and cooling four times, after which let it stand for six hours, and then decant it into a bottle, adding about six drops of essence of lemon.

J. S. H.—This correspondent, if we may judge from his very cleverly-written letter, has proved himself too clever by half. From the widow of a deceased photographer—a lady entirely ignorant of photography—he purchased a quantity of chemicals and residues, giving what he thought was a tenth part of their real value. From one of the parcels he has sent us, for examination, a sample of what he believes to be pure chloride of silver, and for which he expects a large return. Alas! for his expectations! The valuable mass of "chloride of silver" is composed of common whiting and water, and nothing else. It seems to have been mixed for cleaning plates or windows. Under the circumstances we must decline offering any assistance to our correspondent, who has been "hoist with his own petard." We are not surprised at his specially requesting us to withhold his name.

MYOSOTIS.—1. About the time this meets your eye you will have a communication from the refiner, with an enclosure.—2. Our experience of palladium as a toning agent is extremely limited. We find that platinum answers the same purpose, while it can be obtained with greater ease and at a lower price.—3. Chloride of gold in our hands works with perfect cleanness. You probably have not subjected the plate to a sufficient washing after fixing before applying it. In our hands, too, it does not produce the surface deposit of which you speak, but tones the film throughout. If the solution be weak the toning will be effected only on the surface, but it will assuredly penetrate to the back if time be allowed.—4. We have not noticed the milkiness spoken of in the developer, but this may arise from our limited experience with a developer containing formic acid.—5. Citric acid, if present in sufficient proportion, will certainly prevent for a considerable time a deposit in the developer; but its use necessitates a longer exposure in the camera.—6. Both kinds of dry plates mentioned are good, and each kind has its special advocates. If we were going to the country with a camera we should accept either of them; and if we failed in obtaining good negatives we should be more inclined to attribute the failure to some shortcoming in ourselves than to faults in the preparation of the plates. The other topics will be attended to in a private letter.

NEW PATENTS.

July 16, 1874.—"Improvements in Fixing Colours on Photographic Drawings and in Preparing Surfaces to Receive Colour."—No. 2490. WM. ELLIOT DEBENHAM.

July 27, 1874.—"Photographic Apparatus."—No. 2617. THOMAS LESTER.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 752. Vol. XXI.—OCTOBER 2, 1874.

HOW TO SEE STEREOSCOPIC PICTURES WITHOUT A STEREOSCOPE.

It is very well known that many persons possess the faculty of being able to see stereoscopic pictures in all their marvellous relief without requiring the aid of a stereoscope for that purpose. This faculty renders an important service, which can only be adequately appreciated by those who have acquired the art; for, happily, it is an art which may be acquired without much difficulty.

The ability to see binocular pictures in stereoscopic relief is twofold in its bearings. First: a photographer can examine properly-mounted pictures with the unassisted eye with as much pleasure as though he were using a stereoscope; the effects of nearness and distance will be quite as thoroughly appreciated, and, as a whole, the advantage will equal that obtained by proper stereoscopic inspection, keeping out of sight the enlargement obtained by the examination through the eyepiece, the function of which, in this case, is to enlarge pictures as well as to diverge the rays coming from them. Incidentally arising from this is the possession of a power of being able instantly to detect a pair of pictures which have been wrongly mounted. Some time since a well-known wholesale dealer in stereoscopic slides in London was very much surprised when, upon bestowing what he supposed to be a mere cursory glance at a number of stereoscopic pictures sent in for selection by a photographer, we threw a number aside as being unsuited for sale on account of improper mounting; and this gentleman also marvelled when, upon testing each of these condemned pictures in the stereoscope, he found that in every one of them the effect was pseudoscopic, the near objects being shown as the more distant ones.

Before giving directions with respect to the method by which the eyes may be so tutored as to readily discern between the one and the other we may observe that, if a print from a binocular camera negative be placed uncut in the stereoscope, the effect will be pseudoscopic—that is, the relative positions of near and distant objects will be reversed; but, if a print from a negative taken by what is known as a "Latimer-Clark" camera be examined, it will be found to be quite correct. In the former case the right eye is made to examine the picture intended to be, and which should have been, opposite the left eye, and *vice versâ*. Here is a simple rule to observe:—If the slide holding the sensitive plate has been motionless during the taking of both sides of the picture or during the impressing of both ends of the plate, then the images must be transposed ere they can be seen in stereoscopic relief. We are now assuming that ordinary instruments have been used, and do not intend our observations to apply, in anticipation, to other reflecting instruments which might easily be invented, and nearly as easily made, for the purpose of controverting the rule.

But a second advantage arises—and that not merely the ability to discern between correctly and incorrectly mounted pictures and of seeing *both* in stereoscopic relief, but one of which we have frequently found the value when the binocular camera was directed to a view—we allude to the power conferred of seeing upon the ground glass of the camera the precise effect, as respects stereosity, which will eventually be produced. In the course of our experience we have met with very few who were fully alive to this great advantage, or who, being alive to it, could adequately realise it in their own practice. Yet it is true that by a slight optical effort both the images thrown on the ground glass by the lenses of the camera can be resolved into one, and that image possessing all the relief to be found in nature.

We now come to the means to be employed by which such effects may be secured; and, first of all, we shall suppose the case of a person desirous of learning how to see in proper relief a correctly-mounted picture.

The first attempt must be made by means of a diagram. Upon a sheet of plain white paper let two simple ink-marks, dots or crosses, be made close to the upper margin, and about an inch apart. Now, upon another sheet of white paper place any kind of ink mark, and place it at a distance of about eighteen or twenty inches from the eyes. Now hold the former paper in such a manner as that it shall be about half-way between the eyes and the other paper, the marks being at the top and the position such as merely to allow the single mark to be seen and no more; in short, so that the two marks on the one sheet and the one mark on the other shall be *nearly* in a line. Then look intently at the single, or more distant, mark, and, while doing so, the mind will soon become conscious of the fact that there are *three* crosses or marks now visible upon the nearer paper, which, by the way, may be moved in or out from the eyes till these conscious images coalesce. By a little effort the eyes can soon be diverted from the contemplation of the distant mark to the central one of the three which intervene, and which lies directly in the path of the distant mark.

When after a little practice this can be easily done, then make two marks a little farther apart than those upon which the first attempt was made, increasing, if need be, the distance between the eyes and the sheet containing the single mark. After ten minutes spent in this mode of practice such an amount of control will have been acquired over the muscles of the eyes that a binocular photograph may then be made to take the place of the double-image diagram. But this photograph should be carefully selected; it must have strong leading characteristics, and, above all, its halves must be mounted nearer to each other than is usual. It will be better for the student to select a well-marked picture, cut it through the middle, and make it overlap so as to bring its elementary parts closer together. Treat this picture as was done with the diagram. Let it be held up, at a distance of about eighteen inches, against a sheet of paper containing a mark which is more than twice as far from the eyes. Direct the eyes towards the mark, and they will imperceptibly observe that there are *three* photographs intervening between the vision and the image. Now without any effort let the eyes be insensibly directed toward the central one of the three pictures, and the instant this is effected the picture stands before them in all the relief of nature, being composed of both the original images. We shall not here enter into the philosophic bearings of the act; all we notice is the fact.

When the foregoing effect has been obtained, the eyes will ever afterwards obey the will, and by diverging the axes slightly or, to state it more correctly, by rendering them parallel, stereoscopic pictures may be seen in all their marvellous relief without an instrument.

The converse of this is more easy. The pictures, which must be reversed, are placed directly opposite the eyes at a distance of about eighteen inches, and an object of small dimensions, such as a pencil, held between the eyes and the pictures in such a way and at such a distance that when the right eye is directed to the left picture it shall intercept it to some extent, doing the same thing when the right-hand picture is viewed by the left eye. In this position, examine the pencil attentively, and the mind will soon realise the fact that there are *three* pictures in the background, the centre one of which may, with little effort, be made the subject of examination by the eyes. This method differs from the former, inasmuch as the axes of the eyes converge to such an extent as to cross between the eyes and the picture.

No pain or peril whatever to the organs of vision results from the proper examination of images in this manner, although, like everything else, the power is capable of being abused.

THE *RATIONALE* OF FUMING SENSITISED PAPER.

We now follow up our remarks on fuming paper which appeared a fortnight ago (see page 444) with a few observations bearing more especially on the principles of action of the ammoniacal fumes on the chlorised paper; and we commence by reiterating what we have frequently stated—that the process of fuming applied to sensitive albumenised paper enables us to work with a comparatively weak nitrate bath, and yet obtain as good results in all respects as with a strong bath. If, then, we ask for the reason why fuming is not generally adopted in England, the answer will probably be that "time is money," and that it is, on the whole, as economical to use a strong bath and save the residues as to use a weak bath and spend valuable time in fuming.

Be that as it may, the interesting question still remains as to why a paper sensitised upon a thirty-grain bath and subsequently fumed with ammonia should give as vigorous and brilliant a result, with even a shorter exposure to light, than the same paper excited upon a sixty-grain bath.

As a right reply to the above question may throw light upon some of the new negative processes we venture to offer the following explanation of the mystery:—

In the first place, let us consider what happens in the case of a piece of common, *un*fumed, sensitive albumenised paper when it is exposed to light. There can be no doubt that whilst this is being darkened by exposure to light nitric acid is freely evolved from the sensitive material. This it is which, retained by the pores of the paper, renders the water acid in which prints are first washed, and which, by escaping, renders acid the printing-pads of the pressure-frame. Some persons have imagined that hydrochloric acid is also evolved; but it is difficult to understand how that can be so long as there is free nitrate of silver present in the paper to convert it into silver chloride again.

Of what, then, does the darkened material consist? On treating it with nitric acid it is almost entirely dissolved, and there remains beneath only a trace of pale-grey subchloride of silver. This may be subsequently dissolved by hyposulphite of soda, and there is then only left a pale stain upon the paper. The darkened material seems, therefore, to consist either of silver oxide or metallic silver in a state of mixture or combination with albumen.

Meantime, what has happened to the silver chloride? If, after removing the darkened material by nitric acid, we wash the paper thoroughly, and again expose it to light, we find it take very quickly the grey colour of subchloride of silver; which proves that some, if not all, of the silver chloride originally in the paper has remained in it still unacted on by light.

This is a very strange result, and the question at once arises—Of what use has the silver chloride been in the formation of the dark material of the print? Has *any* of it been decomposed so as to yield up its silver? or has the *whole* of it remained unacted on by light? In other words, has the free silver nitrate *alone* been reduced, and has the silver chloride merely acted by its presence catalytically in accelerating the red ion of the silver nitrate?

This question is a most interesting one, practically, because we may remember that, some months ago, a French experimentalist (M. Redon) affirmed that many inert substances which he had tried had, by their mere presence in contact with silver nitrate, conferred sensitiveness upon it; and he cited oxide of zinc as an example.

The following experiment has led us to believe that but little of the silver chloride in a common sensitive paper is really reduced by light in the process of printing, and that very nearly the whole of the darkened material of the print is due to the reduction of the free silver nitrate:—

Excite a piece of salted albumenised paper, cut it in half, wash all the free nitrate out of one half, and hang up both halves to dry. When dry, expose to light until it is thoroughly darkened that half in which the free nitrate has remained; then dissolve with nitric acid the darkened material, wash the paper thoroughly, and dry it. We have now two pieces of paper containing silver chloride only and no free nitrate. On exposing them both to the light side by side they are found to darken *with equal rapidity and to the same depth of greyness*, which seems to prove roughly that there is an equal quantity of silver chloride in both pieces, and that little or none of the silver chloride was reduced in the first piece which was exposed to light.

We seem, therefore, to be justified in concluding that in the common printing process the silver chloride acts by its mere presence in accelerating the reduction of the free nitrate, and is not itself reduced. And here we may remind the reader of the fact that a gelatinised or albumenised paper containing no chloride of sodium may be excited upon a nitrate bath, and will yield, though slowly, a rich and vigorous print.

Next, let us consider the case of a piece of fumed sensitive paper. This kind of paper may be excited upon a weak nitrate bath, and the free nitrate may be entirely washed off, so that the paper will keep almost indefinitely, and it will even then, after being fumed with ammonia, yield a magnificent print. Why is this? What explanation have we to offer as to this strange result? May we venture on the following?

When silver chloride, with albumen, but without free nitrate, and in the presence of ammonia, is exposed to light, the silver chloride is decomposed, some of its chlorine takes the ammonium to form chloride of ammonium, and the oxygen goes to the silver to form silver oxide, which combines with the albumen to form the rich, red, dark material of the shadows of the print. Thus it appears that when ammonia is present little or no free nitrate is required; and that is why fuming answers the purpose so well with a weak bath or with a washed paper.

In the case of *un*fumed paper the blacks of the print are produced by the reduction of the free nitrate; and that is why a strong bath is required, and why the free nitrate must not be washed out of the paper. In the case of fumed paper the blacks of the print are produced by the reduction of the silver chloride; and that is why a strong bath is *not* required, and why the free nitrate *may* be washed out of the paper.

In the case of a fumed paper which has been excited upon a weak bath and *not* thoroughly washed, both the free nitrate of silver and the silver chloride will be reduced, and thus a magnificent print will be got, since the dark material of the shadows is obtained from both sources. The fact of the ammonia neutralising the nitric acid as it is set free from the silver nitrate will add to the sensitiveness of the paper and the vigour of the print.

And now it only remains for us to explain how it is possible for silver chloride to act by its mere presence in accelerating the reduction of the free nitrate in an *un*fumed paper.

Chlorine has a strong affinity for silver, and a tendency, if possible, to combine with three atoms of silver instead of with one atom. Thus when silver chloride is exposed to light in the presence of silver nitrate the latter has a tendency to be decomposed, the affinities which bind its atoms together being loosened. On the other hand, albumen has a strong affinity for silver oxide. The result of this is that the silver nitrate is more readily decomposed, and the dark, red, vigorous compound of albumen with silver oxide formed, when chloride of silver is present than when it is not.

Hitherto it has been supposed that in positive printing it is the reduced silver chloride which forms the blacks of the print; but the reduction of silver chloride by light only leads to the grey subchloride, which is soluble in hyposulphite of soda and insoluble in nitric acid—properties which the blacks of a print do not possess. The mere presence of albumen or other organic matter only modifies this result in a slight degree.

Let it be clearly understood, however, that we do not offer the foregoing remarks in a dogmatic spirit, but simply as an attempt to explain one of the most interesting phenomena in our art-science. Those who do not accept the explanation above given must not only show that we are wrong in our facts in regard to the experiment described in the tenth paragraph of this article, but also how it can be possible, if the silver chloride be really reduced by light in the ordinary printing process, that chlorine or hydrochloric acid can be set free from a paper containing free silver nitrate without converting the latter into fresh chloride or subchloride of silver; and if into the latter why the shadows of the print are deep red and vigorous instead of being pale grey and mealy, and why they resist the action of hyposulphite of soda but not of nitric acid.

The practical conclusions which seem to result from our remarks are these:—

In the case of *un*fumed paper there must be an atom of free silver nitrate and also of albumen for every atom of silver chloride; whilst more free nitrate than this will be useless, since it will not be reduced. Also that the printing pads must be renewed from time to time, as they become charged with nitric acid.

In the case of fumed but *un*washed paper the albumen need not be highly salted—four grains of common salt per ounce being probably sufficient; whilst the strength of the nitrate bath need not, perhaps, exceed twenty grains to the ounce. The increased sensitiveness of fumed paper, combined with the good keeping qualities of paper washed before fuming, seem to recommend the process especially for use during the winter season.

Lastly: the question arises whether a fixed alkali might not be substituted for ammonia, and be applied in the form of a solution to a washed silver chloride paper.

A COMMUNICATION received from Canon Beechey on the subject of blurring caused us for a short time some astonishment. With the view of ascertaining in the most perfect manner the blurring influences of the light which passes through a sensitive film on the front surface of a glass plate, and is reflected from the back surface on to the sensitive film again, our talented friend, with a courage which does him credit, determined upon attempting the *experimentum crucis* of silvering the back of the plate upon which the image was to be developed, so that if blurring should result from reflection it must occur in the most complete manner. A non-actinic backing absorbs the light transmitted through the film; surely a silvered or perfectly-reflecting backing would not merely fail to absorb the light but send it forward again to do all the mischief possible. At this stage we introduce an extract from the letter of our esteemed correspondent:—

"I herewith send you four negatives from collodio-bromide plates—two half and two quarter plates; one of each is unbacked, and was exposed with only yellow paper behind it. The other two are silvered on the back by Liebig's process, coated with sealing-wax dissolved in alcohol. Each pair was exposed on the same subject, viz., the half-plates on this house and the quarter-plates on the church, with the same light and exposure. The first subject is a very trying one for flare or diffraction, being a bright house with blue-slated roof coming off a bright sky, and surrounded by foliage, so that it is impossible even to get the foliage clear without completely mingling house, roof, and sky together; and the other subject is also difficult, being a white tower with bright roof to the building. Now I have not, as you see, removed the silver backing on either, because I wish you to do it yourselves; and I venture to prophesy that you will not find the silvered negatives one bit more blurred than the others, nor even as much so. On the contrary, I fancy you will find a *sharper* and *denser* definition of all the *fine lines*, showing, as I said in my former letter, that the reflection from the back ought to and does send back the image at right angles to each surface, so as to *repeat* the image on the sensitive surface. I must, therefore, think that blurring is produced by the reflection of diffused light from some plain matt surface, like blacked paper or tin, or even such backing as is not actually *non-actinic*; and I really doubt, from my late experiments, whether blurring may not be prevented, and better, sharper, and denser negatives produced by plates with silvered backs than by any other means."

Agreeably with the permission accorded to us we have removed, to a partial extent, the silvering from the backs of the negatives, and find that they are, at least, as free from halation as those which were not backed. Without pausing to inquire how far the freedom from blurring may not have arisen from the density of the film, we may remark that we should like to see the experiment repeated on a still more trying test object—one plate being backed in the usual way with a red pigment, and the other with the silver. Unless the films were unusually dense, we are of opinion that a difference would, under these circumstances, be perceived between the two resulting negatives. Probably Canon Beechy will kindly decide this by making another experiment.

PRACTICAL NOTES ON THE SAVING AND REDUCING OF RESIDUES.

CHAP. IV.—ON REDUCING THE RESIDUES TO THE METALLIC STATE.

Having provided a furnace it is also necessary to have the following appliances, viz., a pair of strong crucible tongs, and an iron rod about three feet long and five-eighths of an inch in diameter, one end of which should be made wedge-shaped by heating it until red hot and then flattening the end with a hammer; this is to serve as a poker. A piece of iron wire about a quarter of an inch in diameter is also required for stirring the contents of the crucibles, together with an iron spoon with a long handle, the bowl of which has been bent into the shape of a scoop, and a large glove or shield to come some distance up the arm. This should be made of two or three thicknesses of carpet or other thick woollen material, the object being to protect the right hand from the heat when removing the crucibles from the fire, and to enable the operator to do this leisurely, for if done in a hurry it might lead to serious accidents. Next obtain some clay crucibles, known as "skittle pots" from their shape; these may be purchased at most of the jewellers' material dealers in Clerkenwell, and should be about ten inches in height. Although the furnace would take a larger pot the beginner should be content with this size, as it is more easily manipulated.

Having all these things ready, we will proceed to light the furnace by placing some paper and wood at the bottom, followed by a few lumps of coal and then some coke, until it is about half full. After closing the lid and withdrawing the damper a light should be placed under the bars; the furnace should not be opened until the fire has burnt up and well heated the flue, so as to establish the draught. The fuel to be used is kiln or furnace coke, which should be broken up into lumps about the size of a hen's egg. This kind of coke is coal burnt in closed kilns or coke ovens, and has far greater heating properties than gas coke.

Whilst the furnace is heating we will proceed to flux the residue by mixing with each pound of it half-a-pound each of well-dried carbonate of potash and carbonate of soda. It is generally recommended to add double this quantity of flux; but I find this proportion ample, unless the residue contain a very large quantity of foreign matter. A crucible is now filled to within an inch of the top with the mixture. By this time the fire should have burnt up and the draught be thoroughly established. The lid may now be removed, and the fire should be evenly distributed over the bottom of the furnace with the poker; more coke is added, and on this cold coke the charged crucible is placed and surrounded with more fuel to within two or three inches of the opening of the flue. By proceeding in this manner the crucible gets heated gradually without danger of cracking; the top of the pot should not be above the flue. The damper must now be partially closed and the lid of the furnace left open. As the heat increases the contents of the crucible will liquefy and begin to boil and decrease in bulk, when some more of the mixture may be added with the spoon, taking care not to touch the sides of the pot with it, for fear of cracking it. After one or two additions (it is advisable not to overcharge the pot) the heat may be gradually increased by partially closing the lid and withdrawing the damper a little. If a blue flame should appear on the surface of the contents of the pot, caused by the sulphur from the sulphide of silver, a few small lumps of saltpetre should be dropped in, one at a time. This will assist the decomposition of the sulphide.

The pot should now be carefully watched to see that the contents are kept boiling and not be allowed to boil over; but if, after the heat has been considerably increased, it appear thick and pasty, a little more flux should be added, taking care not to touch the pot with the cold spoon. After it no longer shows a disposition to boil over, the pot, if it has sunk low in the fire, should be raised, the fire made up, and the heat still further increased by closing the lid and withdrawing the damper. It will be well to open the furnace in about five minutes to note progress and see if any portions are adhering to the sides of the pot; if so, they should be pushed down with the wedge end of the poker, but not until it has been made red hot in the fire, or it will most assuredly crack the pot. The contents should be also stirred with the thin rod. The furnace must now be closed and the pot allowed to remain undisturbed in the full heat for about fifteen minutes, by which time the reduction should be complete; but a little experience will soon enable the operator to judge from the appearance when this is the case. If upon opening the furnace the contents of the pot appear quiescent at the bottom, or, rather, having a steady upward motion from the centre, it may be assumed that the reduction is complete, and the pot may be removed from the fire. To do this put the glove on the right hand to shield it from the intense heat, then grasp the pot firmly with the tongs, and lift it on to the flat plate of the furnace to cool. The damper should now be partly closed and some of the fire lifted out with the tongs, so that the furnace may cool ready for the reception of another pot, which should be placed on some cold coke and surrounded with it, as in the case of the first one, to secure its being gradually heated.

The first pot, after it has cooled down somewhat, may now be removed to a colder place. On no account should the pot be broken until the contents have become *quite solid*, nor should any water be splashed into it, as it would make the flux spurt out and cause serious burns. When the pot is broken it is easy to judge from the appearance of the metal if the operation has been successfully performed; for, if so, it will have a clean, bright appearance, and be free from flux. If, on the contrary, it appear dull, dirty, and honeycombed, and the flux contain small globules of metal, the time has been too short or the heat not sufficient. When this is the case the whole, flux and all, should be put into another pot and the operation repeated. In all cases it is better to overdo than underdo it. Beginners frequently fail from hurrying the operation.

Whilst the crucible is in the fire the ashpit should be kept free from ashes, so that in the event of its breaking the silver may easily be collected after it has run through the bars.

The amount of metal which may be expected from each pot of the size recommended to be used in the first trial, if the residues have been collected with ordinary care, is from fifteen to twenty ounces, and the whole time occupied will somewhat exceed an hour.

CHAP. V.—GOLD RESIDUES.

Although the metals to be recovered from old and inert toning baths consist of silver and gold, the former in larger proportion than the latter, it is advisable to keep the residues separate from the ordinary silver wastes; as, although the gold would be left behind in the vessel in which the silver is dissolved if it were converted into nitrate, or be paid for by the refiner if sold by assay, it is better that the gold should be, so to speak, as little diluted as possible.

For the reception of the exhausted toning baths two large bottles—glass ones by preference—should be provided. A very convenient size is that holding about one gallon. Into one of these the old bath is to be poured, and when full a little protosulphate of iron solution is to be added; this will precipitate the metals contained in it, which will have subsided so that the supernatant liquor may be decanted by the time the other is full. It has been recommended by Mr. Hart, who is no mean authority, to make the solution acid with sulphuric acid before adding the iron, so as to prevent the precipitation of oxide of iron with the gold. In my own practice I do not do this, as I always treat my gold residues by what may be called "the wet method," by which means any iron present will be dissolved out with the silver. If, on the contrary, they are to be recovered by means of the furnace the presence of iron will cause some trouble; and to ensure its absence the solution should be acidified before adding the iron, or, rather, a little acid should be put into the bottle before the bath is poured in.

I will now describe how the metal is to be recovered in the form of a button. First: the precipitate should be emptied on to filter-papers to drain, and as the sides of the bottles will, no doubt, be coated with a deposit consisting for the most part of gold, this should be dissolved off with a mixture of nitric and hydrochloric acids, then precipitated with iron, and the whole added to the other residue on the filters, which must then be dried. Next: any filter or other papers containing gold should be burnt, and, as the quantity will be small, this may be more conveniently done by filling a small crucible with it and placing it on a common fire, adding more from time to time as it is consumed. The cuttings of toned prints, of course, contain *some* gold; but when we consider the large surface of paper which can be toned with a single grain of gold it will be seen that the saving of this will not pay for the time which must be bestowed upon it. The ashes should now be emptied out of the crucible and mixed with the dried precipitate. To this is to be added an equal weight of a mixture of the carbonates of soda and potash, together with a little borax, and again returned to the crucible, which should now be placed in the furnace and treated as directed for silver, giving it *plenty* of heat.

If it has been determined to convert the gold thus reduced into chloride instead of cash by selling it to the refiner, some more silver must be added to it, so that the quantity of silver exceeds that of the gold by about three parts; as, unless this proportion of silver exist, the gold will protect it from the action of the boiling nitric acid with which it is subsequently to be dissolved, when it leaves the pure gold behind, which, after washing to free it from silver, may be dissolved in nitro-hydrochloric acid and crystallised as directed in all works on chemistry.

I will now describe the moist method, which, I think, is the one that will be more generally adopted by the photographer, unless, as is not generally the case, he has large quantities to deal with, because the gold is recovered quite pure as a fine powder, which is a very convenient form for converting into chloride. In this case the residues should be emptied into a glass flask without drying, although drained as dry as possible; and the paper having been burnt in an iron ladle to reduce it to the smallest bulk should be added to them, and nitric acid added in the proportion of one part of acid to each two parts of the water that is supposed to be still mixed with the residue. This acid should be free from hydrochloric, the presence of which would cause solution of the gold, which is the thing we must avoid doing at present. The presence of hydrochloric acid may be detected by its causing opalesence when dropped into a solution of nitrate of silver, The flask should now be placed over a spirit lamp and allowed to boil for a short time; this will dissolve out all the metals except the gold. The solution should then be poured off, and fresh acid and water added, and the boiling repeated so long as any silver continues to be dissolved in the liquor. After pouring this off the residue in the flask should be washed with several charges of distilled water until it shows no trace of silver when tested with a chloride. Of course the solution and washing waters should be saved and added to the silver wastes. The metal now remaining in the flask consists of gold, which, after draining closely, must be dissolved by pouring on to it one part of nitric acid to five of hydrochloric acid, and boiling as before. It should now be decanted on to a filter placed in a clean bottle, and more acid added to the flask, and the boiling repeated, so as to ensure the entire solution of the gold. This, and also several changes of water, with which the undissolved contents of the flask must be washed, should be filtered into the bottle. I need not say that, as this solution is very valuable, great care must be taken not to waste any.

This liquid is a solution of chloride of gold of an unknown strength, and, as yet, too impure for photographic purposes. The gold must now be precipitated by a filtered solution of protosulphate of iron and well washed with many changes of distilled water, to remove all traces of iron. The gold, which is now in a pure state, may then be emptied into a small capsule or evaporating dish, and dried. After it is quite dry the capsule and its contents should be weighed. The gold must now be dissolved by a mixture of one part of nitric acid, five parts of hydrochloric acid, and three of water, using a gentle heat to assist its solution, and no more of the solvent should be used than is required. It may then be crystallised if thought desirable; but it will, however, be found more convenient to neutralise the solution with carbonate of soda, and keep it as a stock solution.

After the capsule is empty it should be again weighed, and the difference of weight will show the amount of pure gold obtained, each grain of which is equal to about two of the chloride. The solution may now be diluted to any strength; but it will be found to keep best when not too much diluted, a convenient strength being thirty-two grains to the ounce. It is necessary that the stock solution should be made slightly acid with hydrochloric acid to prevent precipitation of gold.

E. W. Foxlee.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

When walking, a few days ago, along a road overhung by trees I observed to a friend that while the autumnal gales had effected a great clearance of the leaves which, owing to the advanced period of the year, had become rather feebly attached to the parent stem, the progress of time had also effected a change in the tints of the foliage which left them in a singularly excellent condition for the purposes of the photographer. A month since these various trees could not be distinguished at a short distance; but now, some being green, some reddish, others yellow and brown, there was an individuality about them which permitted their varied forms to be easily distinguished. Against this it was urged that these autumnal hues, so lovely in themselves and so conducive to the beauty of a landscape, were fatal to photographic representation on account of the very tints which at present impart to them their peculiar charms. Now, every person seems to realise the fact that in photography yellow and black are, in some sense or other, synonymous terms—a "fact" which was only apparently so several years ago, but which is now becoming generally exploded. In the old days of iodide of silver and pyrogallic acid development there was an excuse for holding fast to such a dogma; but *now* our plates are sensitive to even the deepest orange rays. I affirm that the warm autumnal tints are *quite* as easy to be photographed as those of spring or summer, and I do this without a particle of the factious feeling which would prompt a denizen of one end of the Sandy-row populace you recently described to walk on a summer's evening up to the other end with a "dhudeen" in his mouth and his hands in his pockets, or, like others of his pugnacious countrymen, to invite a hereditary foe to "thread on the tail" of his coat of many colours. Green—certainly some of its tints—is so very non-actinic that as regards photographing it yellow becomes a mere joke, and even red and brown succumb. This suggests one or two philosophical ideas, and first—What is a non-actinic colour? or, to invert the question—What colour is most easily impressed upon a chemically-prepared surface? "Oh," says Mr. Verdant Green, "it is *blue* of course, because, you know, that if you cover a piece of chloride of silver paper with three pieces of glass—each respectively blue, yellow, and red—it changes rapidly under the blue, but takes an enormously long time to be acted upon by the red." True, O sapient Mr. Green! but what have you got to say to my statement that if, instead of chloride of silver paper, you use sub-chloride paper things are altogether reversed, and red will be found the sensitive colour, blue being decidedly slow? Circumstances, you see, alter cases; and it is about as easy to dogmatise on the respective chemical powers to be found in rays of certain colours as on the constitution of primary as distinguished from secondary colours. I predict with the utmost confidence that before long the astute investigator in photographic science will have panes of various colours in the window of his dark room, so that when he wants chemical darkness he may let down either the blue, the green, or the orange pane to suit the character of the work on which he is engaged.

I am greatly pleased that Mr. Sutton has once more become a resident in this country. In these discursive *Notes on Passing Events* I have more than once taken the liberty of criticising some of his opinions; but I trust I have said nothing that anyone would construe into aught save respect and admiration for a man who asserts his opinions openly and honestly, although they may not be quite in harmony with those of others. If Mr. Sutton has come back to England in quest of health, may he abundantly find it, and may we have him long in our midst!

Wanted to know—what change takes place in nitrate of silver when acetic acid is added to it. In a quotation you have given from Hearn's "Practical Printer," I find, under the heading *Acidifying the Prints*, that he recommends the prints to be placed, before being toned, in diluted acetic acid, in order that the nitrate remaining in the film may be "perfectly converted into the acetate of silver." Now, with all deference to Mr. Hearn, I think that acetate of silver is never formed by the direct contact of the acetic acid with the nitrate of silver, but by decomposition. By the admixture of solutions of alkaline acetates with the nitrate we get the product in question. For example: when for this purpose acetate of soda is used we obtain nitrate of soda and acetate of silver; but under no circumstances is the latter salt ever obtained by the mixture of the acid with the solution of the nitrate. The well-known aceto-nitrate of silver bath used in the albumen and paper negative processes is not a solution of acetate of silver, but merely one of nitrate of silver *plus* free acetic acid.

Now that the exhibition of the London Photographic Society is announced, one is naturally looking also for some announcement concerning that useful exhibition connected with the South London Society in which objects of technical rather than art interest form the items for display, and which has hitherto been held during the exhibition of the older body. No doubt the matter is quite safe in the hands of the sub-committee to whom was last year entrusted the effective carrying out of this technical exhibition; but it is now more than time that the regulations governing the exhibition were published *in extenso*.

There are two sides to every question; and this applies to the question of the advisability of giving medals at photographic exhibitions. Contrary to the views taken by the Editors, I believe that if managed with even a moderate measure of wisdom the medal system has much to recommend it. At any rate I know of several photographers who but for the medal bait would never, probably, have exhibited a picture in public. Who, for instance, were it not for this inducement, would even so much as think of sending their pictures to Falmouth, to the exhibition of the Cornwall Polytechnic Society? It is evident that the greed for medals shown by some photographers—not necessarily other than really excellent artists—is sufficiently great to cause them to exhibit their works where all other inducements might prove futile. It certainly ought to be expected to increase the number of exhibitors, and thus bring fresh men into the field; although, *per contra*, it necessarily exercises a deterrent influence upon those occupying the foremost ranks.

ON CLEANING PLATES.

Perhaps there is no branch of science or art the successful manipulation of which depends more on little matters than photography; and nothing in the whole range of photographic work conduces more to success or failure than the state of cleanliness to which the plates are brought previous to being coated with the collodion film. This fact is so patent, and the result of inattention to its demands so forces itself upon the merest tyro, that by one or other of the many methods from time to time recommended he soon overcomes the difficulty, and clean plates become the rule with him as with most manipulators. This state of matters, however, is, I believe, in the majority of cases attained with an amount of slush and work not only altogether unnecessary, but often sufficient to dishearten the would-be photographer at the beginning of his career, while the very thought of it frequently deprives an amateur of many pleasant half-hours with his camera which he would otherwise have enjoyed.

I do not, of course, in this article write for the professional photographer, who generally has a skilled assistant accustomed to the work, or who may consider it a capital means of training for his apprentices, and to whom, therefore, the labour of cleaning plates is little more than a memory; but rather to the ardent amateur, whose time is limited, and who, having to be his own assistant, would gladly reach the desired goal by a cleaner, nearer, and pleasanter road. This I think I can help him to do by describing the method I have adopted for many years, and which has on several previous occasions been recommended with all the force at command.

For our purpose plates may be divided into two classes—those which have been used, and those which have not. The latter, just as they come from the glass-cutter, are very easily managed; the former are a little more troublesome, and as by one operation they are almost immediately brought into the condition of unused plates we shall describe that operation first.

In a saucepan or iron pot, capable of holding half-a-gallon, place two pints of water and half-a-pound of carbonate of soda (common washing soda), and dissolve by heat; in fact, bring it to the boiling point, and, while boiling, stir in gradually two ounces of freshly-slaked lime mixed with two ounces of water. Let the whole boil for five minutes, and the solution will be ready for use. Pour it, while still hot, into a flat porcelain dish, and then slip the plates into it, one by one. After an immersion of half-a-minute even the hardest varnished film will peel off like a piece of loose gelatine; and by a wash under the tap the plates will be freed from every trace of the solution. They may then be wiped dry, or allowed to become so spontaneously, when they will be in the condition of unused plates.

The solution will keep indefinitely, and may be used over and over again, only requiring to be brought to the boiling point each time. Those who do not care to take the trouble of making the solution may find an excellent substitute in Green's washing powder, three penny packets of which dissolved in a pint of boiling water will remove the films from more than a hundred plates.

The plates thus cleaned, or those which have not been used, are in a few seconds made chemically clean by the following simple treatment:—A plate-cleaning solution is prepared by putting into an eight-ounce bottle half-an-ounce of jewellers' rouge, six ounces of methylated spirit of nitric ether, and two ounces of water. This should cost about tenpence, and is sufficient for at least a gross of whole plates. The method of using the solution is to pour a few drops on the centre of the plate, rub well with a tuft of cotton wool, and then with two cloths, respectively marked "No. 1" and "No. 2," rub first off all the red powder, and then give a final polish by a rapid circular motion. In this way a dozen plates may be made absolutely clean in less than ten minutes, at a very trifling cost, and with less fuss and mess than by any other method with which we are acquainted.

The best cloth for the purpose I find to be a kind of singed calico sold by linen-drapers as "glass cloth." At first it should be soaked in water for some hours, and then thoroughly washed, after which it need never be washed again; in fact, the cloths really seem better for this purpose after getting thoroughly saturated with the rouge.

Your readers will doubtless say that there is nothing new in all this. Well, having already published it, I do not believe there is. But if I may judge from the many complaints made from time to time of the evils of dirty plates, and from the host of methods recommended for the removal of varnished films, I fear there are many who have never tried the simple and certain plan now recommended.

I am aware that the use of caustic soda and potash has been condemned in consequence of an alleged tendency to attack the surface of the plate; but I can only say that I am at present working with plates which have been submitted to the ordeal at least fifty times, and, so far as I can see, they are as good as ever. T. N.

FOREIGN NOTES AND NEWS.

Photographic Improvements in Connection with the Portuguese Ordnance Survey.—Etching Designs for Negative Printing.—Statistics of the Art in Berlin and Vienna.—Vienna Exhibition.—Cartography Abroad.—Improvements in Paper.—Acid and Alcohol in the Developer.—New Formulæ.—Photographic Benevolent Society in Paris.

Some time ago, if our readers recollect, mention was made in a report of a meeting of the Photographic Society of France of a new process by M. Rodrigues, a Portuguese photographer. The details of that process were not mentioned then, but they are worth recalling. M. Rodrigues is a young photographer, and he has only pursued a special department of photography, being, as he is, manager of the photographic department in the Portuguese Ordnance Survey Office. Map and chart copying thus constituted his employment, and it was to the perfecting of the mechanical photographic processes by which this was accomplished that he turned his attention. In copying drawings his difficulty lay very largely in the paper. It was given to expand unequally, and the grain of the paper got too pronounced to permit actual copying of details, or, when large sheets were in question, it was sometimes impossible to get even contact all over the surface. To remedy these and other evils M. Rodrigues thought of using thin plates of metal finely polished, and he communicated to the Photographic Society of France some comments and proposals upon this point, advocating zinc plates. But these did not work perfectly; inequality of expansion and graining marks were, doubtless, got rid of, but there remained the difficulty of obtaining complete contact over all the surface. He substituted, therefore, plates of tin, which met this difficulty much more fully, it being a much more elastic and pliable metal.

The plate of tin is not thicker than a sheet of thin paper. The thinner it is rolled the better in fact, provided it is not squeezed into holes. The sheet is first satinised by being placed on a finely-grained lithographer's stone and rolled with a slight pressure only. Hard pressure tends to make the metal brittle, and renders it liable, therefore, to tear; and the employment of a polished stone to smooth its surface upon would render it incapable of biting sufficiently to take the gelatine. When the fine, smooth, dead surface has been communicated to it the sheet has to be cleaned. For this purpose it is placed upon a plate of zinc slightly damped, laying it down as one would put a sheet of albumenised paper on the silver bath. It is then washed over with a pad wetted with a solution of potash or soda about ten per cent. strong. This rinsed off, and the surface thoroughly cleaned of the alkali, the bichromatised gelatine is carefully spread over the surface with a soft brush. There is nothing peculiar in that solution; the gelatine is mixed with bichromate of ammonia in the usual way. The surface, when thus treated, should be perfectly homogeneous and of an amber colour. The plate is dried rapidly in an oven or gas stove, and then the gelatine pellicle is placed on a sheet of zinc with its tin support lowermost and subjected to heat. When the upper surface is dry it is lifted off the zinc, turned over, and once more subjected to heat on the under side. The plate may be exposed under a negative in the ordinary way without the zinc support having been removed, and a gentle pressure applied by means of a roller covered with flannel will then, perhaps, be sufficient; but in all particular cases the tin alone should be used to support the sensitive surface.

There is nothing new in the inking and further particulars of the process, the sole noticeable fact being the value which a thin sheet of tin has as a support. It prevents unequal expansion and many other evils, and may be said to render chart copying simple and perfectly mechanical—only that we fancy when the sheets are large the manipulation of such a soft substance as tin rolled out into leaves of paper thickness must be by no means an easy undertaking.

The same gentleman suggested an ingenious method of obtaining designs direct upon glass, although etched or drawn by hand, in a suitable state for printing from. A gelatine solution is prepared, but, instead of being mixed with bichromate, it has white-lead added to it in a finely-powdered state. When a film of this kind is dry on the glass that glass is laid, film side upwards, upon a sheet of black paper, and the drawing proceeded with in the ordinary way. The design is either etched out at once or after a preliminary sketch has been made on the surface with a soft pencil, or a transferred design may be used. When finished and corrected or retouched—things easily done, for misdrawn lines can be wiped out by applying a little fresh solution with a brush to the spot and re-drawing—the plate is cleaned and plunged in a bath containing sulphohydric acid. This immediately turns the white-lead into a dense, very opaque black-lead, while the drawing remains quite transparent. This process might be employed with advantage for producing original designs for notes, &c., which it would be extremely difficult to forge, as designs might be mixed and crossed in ways that would be very puzzling to copy.

According to the new year-book of Dr. Hornig there are one hundred and four photographers in Vienna doing business on their own account, while the number in Berlin is two hundred and seventeen. The inhabitants of the two cities are about equal in number, so that the position of Vienna would appear to be a very backward one compared with that of the sister metropolis. It is probable, however, that Berlin feels now the benefits of being raised to the dignity of an imperial city, and that the influx of visitors gives an employment to photographers which the poorer, though far more beautiful, Vienna cannot now afford. Still one would fancy that there must be room for more business houses in the latter than there is now, if the greater numbers that are in Berlin make a living comfortably. Compared with the number of photographers in London neither city can be said to be overstocked. England might spare a few out of her superabundance without a grudge. Dr. Hornig's year-book has been very late this year; his labours over that ruinous universal exhibition having almost prevented him from any literary labours last year. It contains little that is of interest to English readers, being, in fact, in a literary way, exceedingly meagre, but it provides a handy and good-sized blank diary.

The Photographic Society of Vienna is bestirring itself, and means to imitate that of Paris in getting up a photographic exhibition, aided by the munificence of the *Kaiser Königliche Museums für Kunst and Industrie*, which has, amongst other helps, granted a room in its building for the display. The Society proposes to open an exhibition in the middle of April, 1875. It will be kept open till the end of May—some six weeks. Further particulars will be given shortly. Meantime those of our readers who care to make inquiries can apply to Dr. Hornig, the President of the Society, at his rooms in III., Hauptstrasse, No. 9, Wien (Vienna).

Some particulars were given lately in *Meyer's Journal für Buchdurckerkunst* regarding the Austrian Ordnance Survey Office, or, as it is called abroad (for "ordnance" survey is only an English *grotesquiere*, and a name bearing no relation to the fact), the "*Militär Geographische Institut*," from which it appears that heliography and photolithography are carried out to perfection in the cartographic work of the department. Fineness and softness are obtained in an almost unprecedented degree. The heliographic process was first introduced into the Office in 1859, and since then has been elaborated and perfected. Naturally, the substitution of this for hand copying has induced a great saving of cost in map reproduction. The original drawings have, of course, to be done with greater care than when copperplate or lithographic reproductions were in question; but, that accomplished, the rest is all plain sailing. This extra cost to begin with is, of course, more than compensated for by the saving afterwards, and the cost may be set down roughly as one to three against the old hand-work. The time, too, is shortened greatly. It takes some seven and a-half months to draw and etch the copy of a map in the old way. By heliography, on the other hand, it needs at the outside but three and a-half months, and the advantage is greater still when there is much careful, deep cutting to be done with the graver. In such cases the cost is as hundreds to thousands, and the time as months to years. An example of this may be found in the great map of Central Europe, consisting of 200 sheets, which is in course of preparation just now. In the drawing of this map about thirty-five engravers have been at work for the last six years or more. It is now nearly finished, and considerable advances have been made in the reproduction as well; but had all this been done by ordinary copperplate engraving the work would hardly have been begun yet.

Some time ago the manufacturers of the plain photographic paper known as "Rives"—Messrs. Blanchet Frères and Kleber—undertook to try and meet photographic requirements by bringing out a new and perfect paper. As is well known, that firm and a German one in Malmedy almost monopolise the production of photographic paper, and the former was often blamed for being careless in their manufacture, their paper being usually full of metallic particles that ruined many a print. This new paper has been in the market some little time, and is considerably higher in price than the old. In appearance it differs little, if at all, from that with which photographers have so long been familiar. The system of sizing appears to be the same, and the extremely-divided state of the pulp prevents the paper from having so much toughness as is to be desired. From an analysis of it, published in the *Photographisches Archiv* some little time since by Dr. Julius Schnauss, we learn, however, that it is free from metallic spots, and is sized with a vegetable (resinous) size. When burnt the paper leaves a white ash, which has a very strong alkaline reaction, and is not perceptibly soluble in water, but it is slightly so in acidified water. An interesting experiment was made with a view to testing the printing qualities and behaviour of the paper. In order to isolate the resin sizing, a piece of paper was placed in some water containing a little Na O, where it remained some time, when the solution was filtered and evaporated. One part of this residue was neutralised with $N\ O_5$ and deposited crystals of resin. It was then treated with a couple of drops of silver solution (in the dark, of course), when a whitish precipitate was thrown down, which presently turned yellowish-white, and after a day's standing, still in the dark, became a deep flesh colour. Meanwhile, the behavour of the paper itself under the influence of silver was noted, and it was found that placed in the sun for an hour under a negative the whites did not colour a particle, but if kept over night it browned just as the old sort did. It would appear that the resinous size has, therefore, a strong tendency to help on yellowing.

Many practical photographers know something of the bad effects which, at all events, methylated alcohol has in the developer, and some have gone so far as to say that it should not be used at all. So long as a bath can be made to work without the plates streaking when a developer is applied this is undoubtedly a wise plan; but the plan advocated in some quarters of making up for the absence of alcohol by adding more glacial acetic acid does not seem to work. Fritz Haugk has been trying it lately, and has found it very slow. The one developer contained fifteen grammes of acid and the same of alcohol—the other no alcohol, but forty-five of acid; and, although they both worked pretty much alike the first day, the latter soon got dreadfully slow. We do not wonder at it, and it is surprising that a photographer so intelligent should have made so grievous a blunder. No developer should be unduly restrained from attacking the silver, and the addition of a great deal of acid means that restraint. A better addition to developers which contain no alcohol is greater swiftness of movement when they are applied. The reluctance of the fluids to unite on the surface may be overcome by rapidity of movement, without any danger of developers becoming unusably slow from excess of acid.

M. Davanne, under the title of *Conférences sur le Photographie*—a work recently published—gives the following formulæ, which we feel sure will have a practical interest for many readers, coming, as they do, from so distinguished a photographic chemist and so good a practical man. For the positive printing bath:—

Distilled water	100 c.c.
Silver nitrate	10 grammes.

Add a few drops of a solution of carbonate of soda.

We may remark that this addition is made, first, in order to correct the acidity of the bath, due to the free nitric acid which common silver nitrate contains; and, secondly, in order, by the presence of a little insoluble carbonate of silver, to prevent the discolouration of the albumen. For the toning bath:—

Water	1,000 c.c.
Double chloride of gold and potassium	1 gramme.
Spanish white	5 grammes.

For iodising waxed paper:—

Skimmed milk, clarified	500 c.c.
Potassium iodide	7 grammes.
„ bromide	2 „
Sugar of milk	10 „

This formula will, no doubt, be found good by those who prepare plain paper for enlargements done by development with gallic acid.

A society has been formed in Paris for the mutual benefit of professional photographers and their assistants. Its title is "*Societe de Secours Mutuels des Employés en Photographie,*" the address of the office being No. 24, Rue Petrelle. A circular has lately been addressed by its Secretary (M. Bertholet) to the leading firms, recommending them to apply to the society when they want assistants of competency and bearing good characters. Every applicant for a situation ought to present a letter bearing the stamp of the society. Might not something of the same kind be attempted in London?

M. Valette, 39, Rue de Seine, advertises an apparatus for working the wet collodion process in the field without a tent. Specimens of neoleo-peinture may be seen at M. Puttemans, 11, Rue St. Nazaire. The process of photo-engraving and photolithography may be seen in operation at M. Hermagis', 18, Rue de Rambuteau. The celebrated "Colle Ramié," for mounting, can be obtained at No. 11, Passage du Buisson, St. Louis. The foregoing hints may be useful to visitors to Paris at this season.

THE PRACTICE OF PHOTOGRAPHY IN AMERICA.

With a view to collate the "practice" of leading exhibitors at the Chicago exhibition Messrs. E. and H. T. Anthony, of New York, have addressed a circular to them, requesting information concerning the processes employed, and from the replies received we give the following extracts:—

J. Barhydt, Rochester.—No unusual method save *care* and *skill* is exercised in the use of the *general* formula for producing large pictures.

Wm. R. Howell, New York.—The pictures exhibited at Chicago were produced according to the formulæ given in Howell's *Album*, published by you.

F. S. Crowell, Mount Vernon, O.—We use Sutliff's amber collodion; bath, thirty grains; iron developer; fix with cyanide; T. and M. paper, silvered one minute on a fifty-grain solution. Dallmeyer lenses.

J. Lee Knight, Topeka, Kan.—In regard to formulæ I use only the oft-published and well-known ones; and if anything in my collection of pictures at Chicago was worthy the compliment you confer, *care, cleanliness*, and *practical judgment* are the factors which have entered into the production of it.

Albert Moore, Philadelphia.—Yours received. The pictures I exhibited at Chicago were only plain solar prints on albumen paper from regular negatives. The only formula is the alum silver bath and borax toning.

B. F. Battels, Akron, O.—Any of the good formulæ, with good light and good instruments, united with great care and study, will make just such photographs as I exhibited at Chicago. I use Anthony's cotton.

S. Root, Dubuque, Iowa.—I can give you no formula but what almost everyone on reading it would say at once that they had seen all *that* in the journals; and no doubt they would tell the truth, as almost everything belonging to the art of photography has been published. There certainly have been formulæ enough that are good in the hands of a careful manipulator.

J. W. Black, Boston.—In reply to your question, I can only say that the process by which the best pictures I had at Chicago were made is the most simple and least troublesome one I have ever used—a weak bath from ten to twenty-five grains of silver, very acid; good, strong (or collodion with good body) collodion, sensitised with iodides and chlorides only, *no bromides*. It only wants a little skill and judgment to work in this way, and when once a person has become accustomed to it he never would go back to the old way of using bromides and strong or neutral baths.

E. R. Weston, Bangor.—I made those pictures at Chicago as follows:—Negative bath: fifteen grains. Collodion: iodide of ammonium, three grains; bromide of potassium, half a grain. Developer: iron, eight ounces; water, forty ounces; acetic acid, sixteen ounces. Paper bath: water, sixteen ounces; alcohol, four ounces; silver, one ounce. Lens: 2A Dallmeyer, ridge roof light, ground glass.

H. Rocher, Chicago, Ill.—I have no secret formulæ nor any secret process for making my pictures exhibited at the Chicago Convention. If it be a puzzle, let photographers do the same as I have done—work and experiment—and it may be they will find out something for themselves, which is better than all published recipes and formulæ. The instruments I work with I think you know, for they were all bought from you; but, having an instrument for every different class of work, I could not advise photographers to commit a like folly, for with me it is more pleasure to make pictures than to work for money.

D. K. Prescott, Boston.—In printing, the outside drapery, &c., is toned down by covering the face and exposing to diffused light. Negatives are smoothed up, and prints are retouched with ink and gum, and Chinese white on high lights. I don't know that that is intelligible; but there is no especial process but judgment in lighting the face.

Frank M. Pickerill, Indianapolis.—Our photographs on exhibition at Chicago were a promiscuous collection merely to show the progress of photography from 1868 up to the present date. As an experienced photographer I will say that I have some valuable receipts—one dry process that has never been published to the world—the result of my own labours. I have often been importuned to publish it for the benefit of the profession, and I promise it to you for your next issue of the *Bulletin.*

Bradley and Rulofson, San Francisco, Cal.—The formula we employ in making our photographs is as follows:—Ether and alcohol, equal parts; cotton, six grains to the ounce; iodide of ammonium, four and a-half grains; bromide of potassium, two grains. Silver baths: forty grains, slightly acid. Developer: Water, ninety-six ounces; iron, six ounces; acetic acid, ten ounces; alcohol, six ounces. We cannot but feel complimented that you would give place to our formula in your valuable journal, and regret that we have nothing new in this line to offer; but we will be most happy at any and at all times to contribute such information as rests in our power.

E. P. Libby, Keokuk.—My especial process consists in making the best negatives I can by using Anthony's negative collodion and then printing on German paper. I finish with one of Weston's burnishers, which gives me a good glossy surface. Such were the pictures I exhibited at Chicago. If there be any better mode of making photographs which is not hampered by a patent I wish you would communicate it, and also your reason for inquiring.

Chas. A. Zimmerman, St. Paul.—The views were made with a cadmium collodion, as per following formula:—Ether and alcohol, equal parts; iodide of cadmium, six grains; bromide of cadmium, three grains; Anthony's cotton (winter use), five to eight grains, (summer use) three to four grains to each ounce of collodion; age of collodion, six to eighteen months.

Hoard and Tenney, Winona, Minn.—Our formula is, of course, very much like a great many others; still we differ in *little points*, and it is the *little ones* which need so much looking after. Negative bath: forty grains to the ounce, and slightly acid. Collodion: alcohol, eight ounces; ether, eight ounces; iodide of cadmium, sixty-four grains; bromide of cadmium, thirty grains; iodide of potassium, thirty-four grains; Anthony's No. 2 cotton, seventy-two grains. Time: according to subject, light, &c., but usually twenty-five to thirty-five seconds. We use Hovey's paper with substantially Anthony's formula. Our printing for portraits is usually in the shade, or under a light covered with white tissue paper.

Allen and Rowell, Boston.—We have no new method of making photographs. We use a mixture of collodions from two to four different kinds, as may work best at the time of using or as the subject may require.

S. M. Taylor, Berlin, Wis.—You wished to know my mode of working. I will give it in brief:—Negative bath: forty to forty-five grains, iodised by immersing a plate. Developer: one ounce of iron; sixteen ounces of water; from one and a-half to two ounces acetic acid. Fixing: a strong solution of hypo. with a little cyanide. Printing bath: solution from thirty-five to fifty grains, with ammonia and nitric acid. Fume from five to ten minutes. Toning bath: take gold enough in the requisite amount of water to tone in from five to ten minutes; make it quite alkaline with a strong solution of borax or washing soda. Use salt in the second water before toning. I make most of my collodions as follows:—Ether and alcohol, equal parts; cotton, six to seven grains to the ounce. Formula No. 1: eight ounces plain collodion; forty-eight grains iodide of cadmium; twenty-four grains bromide of potassium, dissolved in a small quantity of soft water. Formula No. 2: eight ounces plain collodion; forty grains iodide of ammonium; twenty-four grains bromide of cadmium. Mix the two together.

Milton T. Carter, Worcester, Mass.—You want to know if I have any special formulæ or mode of working in producing my pictures. I can answer these questions very easily by simply saying "*I have not.*" I use the same formulæ that have been in use for the last ten years, and they have been published over and over again. If I have anything that other photographers have not it must be in the lighting and posing. I spend considerable time about my work (much more than I get paid for here, I think); I take great care about the lighting, and I think if I have done anything worthy of notice it must be in that line. It is a very hard thing to do to tell how pictures are made. A crayon artist might show you a black piece of crayon, and say that that was what he made that beautiful head with; but you might not be able to make one like it. The idea is you must "feel it in your bones." I must confess that I feel quite complimented that you should notice my pictures. I was quite loth to send any to the Chicago exhibition, and I should not if I had not been urged to do so by some of my photographic friends in Boston; but if it has given any one pleasure or profit to look at them I am very glad.

C. D. Mosher, Chicago, Ill.—I received your letter of July 21st, asking if I used any special formulæ for my work. *I have none.* The great secret is in lighting the subject for fine artistic effects, and the manipulation of the negative in the dark room. We treat that according to our subject, style of dress, &c., varying all the conditions of lighting, posing, and manipulating the negative in the dark with the ever-changing subjects, cast of features, and colour of dresses. My light is so constructed as to be under the perfect control of the operator to direct the high light or shadow where it is desired and with perfect accuracy.

C. Gentile, Chicago, Ill.—In reply to your inquiry respecting my formulæ and mode of working, I beg to state that my operating room is, perhaps, different to any other in the United States. The skylight had to be made to suit the building (or I should rather say the proprietors), as they would not allow the walls to be altered in any way. I have a northern light; the skylight is thirty-seven feet from the floor at the highest point. I have also a side light, consisting of four large plate glass windows about three feet apart. With a little skill in working it I can say that I consider I have a pretty good light. As regards formula, I make my chemicals according to my light. I use my collodion more strongly iodised than I would under a different light. I also use a strong iron developer. Children's portraits I take in a few seconds; adults I generally sit from twenty to thirty seconds. I generally use Voigtlander lenses, as I have a very excellent one. During my tour of five years through Arizona I used a lens that came from your house, which was a very excellent one.

J. A. W. Pittman, Carthage, Ill.—My mode of working is as follows:—Negative bath: from forty to forty-five grains of silver to each ounce of water, made slightly acid with nitric acid. Collodion: equal parts of ether and alcohol; to each ounce add five grains iodide of ammonium, two and a-half grains bromide of cadmium, and from three to five grains of Anthony's snowy cotton. Developer: water, sixty-four ounces; protosulphate of iron, two ounces; double sulphate of iron and ammonia, two ounces. To every sixteen ounces of the above add two ounces of acetic acid. Positive bath: forty grains of silver to each ounce of water; saturate with alum, and add one ounce of alcohol to every thirty-two ounces of solution. Float the paper from a-half to two minutes, according to the weather and quality of paper used. Fume ten to fifteen minutes. Toning bath: water, twelve ounces; gold, one grain, made alkaline with saturated solution of sal soda; chloride of sodium, quarter of an ounce. Fix in a moderately-weak solution of hyposulphite of soda, to every gallon of which add one ounce of bicarbonate of soda.

E. L. Eaton, Omaha.—I use my silver bath forty grains to the ounce of water, and keep it in good working order. My collodion receipt is ether and alcohol, equal parts; iodide of cadmium, four grains; bromide of cadmium, two grains; iodide of potassium, two grains; iodide of ammonium, half-a-grain; Anthony's cotton, four grains. An *old* formula but still a *good one.* Developer: the usual strength of iron and acetic acid. The prints were made on the S. and M. Dresden. My method of working is—silver, fifty grains to the ounce of water, silvered from two to three minutes; dry thoroughly and fume from ten to fifteen minutes. Toning bath: made of saturated solution of borax. Soda bath: not too strong; prints from the soda to be put in a strong solution of salt, left in but a few minutes, then changed back to a weak solution of soda again before washing. Prints handled in this way do not blister.

C. H. Lanphear, Findlaw.—The formula used in making the negatives has been that of friend Anderson, as given in his *Skylight and Dark Room*, and with which I have had very good success. The collodion I mixed myself according to that formula. I also made some according to the alteration as given at last year's N. P. A. Convention, and did not succeed so well, the negatives having a peculiar spotty appearance. Having on hand a quantity of old red collodion that was compounded before I used Mr. Anderson's formula, and composed of two or three different lots differently compounded that had been poured together from time to time to get rid of—the remains of a lot that had ceased to work satisfactorily—I took this old collodion and poured into it a saturated solution of cyanide of potassium, a little at a time, till the colour was changed to a light straw, and an oily-looking substance was formed at the bottom of the mixture. After standing a short time I decanted into a gallon bottle, and added that of Anderson's which was working so spotty; and, as the resulting compound was rather thin to suit me, I added a little more cotton, and the next day tried a negative with the best results. It has continued to work good either outdoors or in. That is about all the change I have made from Anderson's formula since I commenced to work it, eight or ten months ago.

J. Battersby, Chicago, Ill.—I have used no formula or means peculiar to myself that I am aware of, excepting perhaps a little ingenuity and patience in arrangement in the making of the pictures to which your note alludes. The arrangement, I believe, is not common; at least I have never seen any precisely similar. If my method will be at all interesting, here it is:—Tack a sheet of silvered paper by the four corners on a board, and expose to light (for whatever shade your background is to be; tone and fix, of course, in the usual way, and mount upon cardboard. Cut out your figures with clean edges, and group and mount them upon the aforesaid with what taste and neatness you may possess. This picture can be copied to any size that may be desired for commercial purposes—*carte de visite*, cabinet, 4-4, or solar, if it be desired in colours or India-ink. One of the pictures represents Mr. John Dillon, comedian, *in propria persona*, together with twelve of his popular personations arranged in a group, making, for his purpose, a very attractive and effective advertising display picture. The other pictures represent twelve personations by Mr. Geo. Giddens, of McGuire's Opera House, San Francisco. Happening to have these two sets just finished to order at the time of the Convention, I just put them in the exhibition to diversify the show a little and devote a corner to Momus.

G. W. Edmondson, Plymouth, Richland Co.—In reply to your query as to mode of working please accept my formula. If it be any different from those generally in use I am not aware of the fact. Plates albumenised with a little bromide of potassium in the albumen. Silver bath: forty grains, neutralised with carbonate of silver or soda, and acidulated with nitric acid. Collodion: ether and alcohol, equal parts; iodide of ammonium, five grains; bromide of cadmium, two and a-half grains; cotton, five grains. Developer: iron, epsom salts, alcohol, and acetic acid, one and a-half ounce each to forty of water. Fixing: I fix all my solars with cyanide, and other negatives with concentrated hypo. Paper: sensitised on your alum bath, or nearly that. Toning bath: water and neutral gold neutralised with bicarbonate of soda. I enclose you a cabinet print of the same subject (the smaller solar exhibited), and I think you will say the solar was nearly as clear as the direct print. You would laugh at my solar if you saw it—a plain pine box, all its dignity in the license stamp; a seven-inch condenser set in a tin rim and sliding inside another tin rim on the mirror head, which is hinged to the side of the window. If there be anything specially good about my solars I believe it is owing to the abandonment of the idea that *any* old, unused quarter tube will do for the solar. I use a splendid 1-3 tube, H. B. and H., and since its use have had reliable and true enlargements, whereas, when I used "any old tube," the resulting pictures were often distorted. I like to make the solar with the same tube I make the negative with, when possible.

Wm. M. Lockwood, Ripon, Wis.—Your favour of the 21st is at hand, and contents noted. I am using the steepest skylight in the West, together with my "actinic screens" for modifying the high lights in faces. I will send you a view of my skylight and reflectors in a couple of days, together with a chemical formula that I vary in the use of, as circumstances require. I think that I satisfied all thinking minds that colours are of different *focal* lengths when I was at Buffalo. Therefore each colour has an actinic force peculiarly its own; and as the colours in the human face vary with the circumstances of life of each individual, therefore each face requires a *special lighting and a special chemical* treatment. My theory of lighting, as carried out in the details of *all* my practice, is to reduce the extreme high lights in a picture to as near the same actinic force as those colours which are slow in actinic action, thereby harmonising the extremes. The one great trouble in photographic portraiture is the solarisation of high lights before the sombre colours have had time to become well defined in the negative. My theory is to equalise this condition, so that high lights shall be well defined and round, the low lights and shadows defined without opaqueness. I am engaged in a series of experiments that I believe will develope something new.

A. J. Shepler, Canton, O.—I have worked the same formula nearly two years, and believe it is working better every day. As I have not seen the same in print it may be interesting to some of your readers. Some two years since I started on a viewing tour. I soon found that I had to make some change in my mode of working. That which I succeeded best with is as follows:—Collodion: ether and alcohol, equal parts; Anthony's cotton, four or five grains to the ounce; iodide of cadmium, five grains; iodide of ammonium, two grains; bromide of cadmium, two grains; chloride of calcium, one grain. This gave me fine detail in shadows and no ghostly high lights. I had my bath at forty, and reduced it to thirty-five, grains. Things looked better, so I have persisted in working the same ever since both in and outdoors. I use the double iron and ammonia, one ounce to twenty-four of water; one to two ounces of acid, owing to condition of bath. Printing bath: forty grains of silver to the ounce, with the same of fused nitrate of ammonia and a small quantity of alum, one or two grains to the ounce. I fume about ten minutes, and red my prints before toning with acetic or citric acid. Tone with gold, just neutral, and about twenty grains of acetate soda to the grain of gold. Fix the ordinary way. I think there is nothing new in this except the collodion. I have recently been making some experiments in collodion with iodide and chloride of cadmium and calcium without any bromide with good results. Will give these after further experiments. The collodion I made the pictures with for the Convention was about one year old; it also works well in ten days. Cleanliness, careful lighting, and plenty of time make better negatives than all the pet formulæ published.

(*To be continued.*)

THE SIXTH AMERICAN NATIONAL PHOTOGRAPHIC CONVENTION.

CHICAGO MEETING.

We have already referred to the fact that the meeting of the above Association took place at the time appointed in Chicago, and we have given a few details of the business transacted. Having received a file of the local papers, we are now enabled to give a somewhat connected account of the proceedings so far as they have been presented to the public. When the full official report is published—if it ever will be—we shall then supplement the present report by giving such details of discussions and papers read as we shall deem worthy of being placed before our readers.

If we are to judge by the reports contained in the files of four daily morning and evening Chicago papers, the matters of technical interest brought before the Convention have not this year realised the anticipations previously formed, while the almost contemptuous silence which they maintain relative to the exhibition is discouraging. But then it must be remembered that during the week of the meeting Chicago was in a state of excitement owing to the ravages committed by a second serious fire which unhappily broke out immediately after the meeting being constituted.

On Tuesday morning, when the hour for opening the meeting arrived, about one hundred members of the Association were reported to have arrived in Chicago, and about seventy-five of these attended the meeting, which was held in the gallery of the building. On the lower floor the display of photographic goods and pictures was large and well prepared. There were pictures of every size, shape, and description, from the portrait of a two-weeks' old baby to that of an octogenarian. The members of the Association wandered through the immense structure, and looked upon and criticised the different specimens of work. At half-past ten o'clock the chair was taken by Mr. Abraham Bogardus, of New York, President of the Association, after which—

Mr. A. Hesler, the local Secretary, gave an address of welcome to the members. It was, he said, with feelings of the most heartfelt pleasure that he stood before them, and in the name of Chicago, and the band of working photographers, welcomed them to that energetic and enterprising city. He trusted that their visit would prove both pleasant and profitable to them all. The preparations to receive them were not all that he could wish; but the time in which to arrange all the preliminaries of the Convention had been so short that many things were necessarily overlooked. The photographers of Chicago had done what they could in the time allowed them; but had it not been for the energetic efforts of the entire force little would have been accomplished. The display of the products of the photographer's art, although not so large as he had hoped it would be, showed a decidedly marked progress, and would give assurance to the world that they were marching on. It was with pride he welcomed them to that city, which but a little over two years ago lay a vast ruin of smoke and ashes, of which now scarcely a trace remained, and in its place they saw a new city, and beauteous to behold, the like of which history affords no parallel. He trusted that much good might be done to their art by their assembling at this their sixth annual Convention. In looking at their faces he saw the spirit of progress fully manifested, and hoped that, like the geni of the West, its strides might be ever onward. He hoped that these annual gatherings might continue to grow in interest and importance, and ere long it might be the pride of every man to acknowledge to the world that he was a photographic artist. He trusted that their deliberations in the vast building that was raised from its foundations to the summit in seventy days would be of so pleasant a nature that they would ever be cherished in their memories as the most pleasant and profitable of their lives.

Mr. Bogardus then responded. He said that in the name of the National Association he thanked him for the cordial welcome which had been extended. Those of the meeting who were from the east expected a cordial welcome from their western brethren. Some had said that the Convention would be a failure, but he thought that such a thing was impossible. He had also heard that the Association was degenerating, but he could not think so. In conclusion, he urged all who addressed the Convention to make their remarks short, and not weary their hearers.

In this Association, as in some societies nearer home, some dissatisfaction prevails with respect to the way in which officers are elected; for we find that after a series of resolutions relating to such elections had been proposed a long discussion ensued, in the course of which the President stated that a report had been circulated that he was endeavouring to pack a committee in order to secure his own re-election, and characterised the assertion as false.

The resolutions were finally adopted, and a committee appointed.

After this had been accomplished, and everybody supposed that things were moving smoothly, Mr. Orland made a motion that the former motion be rescinded, and that the resolutions be laid on the table. The resolution was adopted.

The Treasurer then read his report for the year ending July 8, 1874:—

Total expenditure	$3,559.74.
Total due	3,556.00.
On hand	1.39

The Treasurer also stated there were 1,311 active members of the Association; thirty-five life members; thirteen honorary members, and 201 who had been dropped from the rolls on account of non-payment of dues.

The business of the nominations of officers then arose.

Mr. Loomis made the motion that the election be at large. It was decided to be unconstitutional. A motion was made to nominate a committee of five on nominations. Carried. Messrs. Loomis, Fitzgibbons, Hall, Knight, and Southworth were appointed by the Convention. A motion was made that all officers be practical photographers, on the grounds that stock-dealers should not have a chance of "running" the Association. Some confusion ensued, and the motion was declared to be out of order.

A discussion arose as to the interpretation of the constitution in regard to the appointment of officers, which makes the Secretary and President members of the Nominating and Executive Committee. The Chairman ruled that they had violated the constitution heretofore.

Mr. Bowditch, in the afternoon, was called upon to make some remarks. He said that a few years ago every photographer had his camera in a groove. A few years after the Rembrandt process came up. This was an extreme but a good idea, teaching them that there were other positions in which they could place the subject. They should take time to study their subject, which might present favourable lines in some aspect. Another idea that came up was retouching. At first it had been a secret. A short time afterwards the secret had leaked out, and they had now gone too far. They retouched too much. People who had freckles, &c., wished them left out of the picture. They were too much inclined to humour them to the disadvantage of the art. They ought not to spoil the beautiful art by such a course, but first make a good negative, and not spoil it by retouching.

Mr. Collins made some remarks condemning German finish.

Mr. Lockwood said he did not always make good pictures. It was a great thing to know all the technicalities of the business. Unless a man was a first-rate chemist he could not make a first-rate picture. He also should know the science of optics, and understand light in its electrical and chemical force, or he did not know his art fully. When they were familiar with those sciences they would be able to talk about making good pictures. Their great trouble was that they were too little informed. By the study of their own and their neighbours' pictures they got many new thoughts that helped them to a final triumph. They had made many poor photographers by not requiring hard study.

Mr. Rulofson, of San Francisco, acknowledged the National Association as the source of wisdom. He believed that all ought to tell their secrets. There were three journals published in San Francisco, which used as many as three pictures a month. This line of business should be encouraged. He also believed in advertising, and had a peculiar way of doing it, which he described. He congratulated his hearers on the advancement of the art.

Mr. Webster, of Louisville, exhibited a picture which was yellow in colour. He said it resulted from poor hyposulphite of soda. He also exhibited some pictures of the *souvenir* kind, and characterised burnished pictures as the "greatest humbug extant." The enamel or glaze did not last six months. Albumen was introduced because the paper was porous.

A question was sent up to the speaker:—"What makes collodion turn red?" He said it might be as sensitive when wine-coloured. The presence of acid was what made it red.

A second question was sent up from the audience:—"Are we justified in making glazed pictures?" He said they were, but it was not high work, and it was not creditable to them.

Mr. Loomis, of Boston, made some remarks on the dignity of the profession. He said that the painstaking and competent artist was the man who succeeded, and it was not done by under-bidding and getting on the best avenues, but by doing the best work.

Mr. Hough, of New York, thought that the knowledge of what a picture was should come before the knowledge of how to make it. If this point were forced upon their successors they would probably be better artists. Caricatures were made by exaggerating individual characteristics. They should first have a high ideal and not go beyond it to get the first effects.

Mr. Bowditch thought there should be no secrets kept from the Society. They should be a family with no contentions except that of noble rivalry.

Mr. Lamson, of Portland, Me., said that artists should try to get good negatives at the first or second sitting, because people very seldom retained a pleasant expression afterwards.

Mr. Bell, of New York, read a humorous sketch of the adventures of a picture-seeker.

The President made some technical explanations of the methods of retouching adopted in his gallery. He also disclosed some of the secrets of making good pictures. For instance, he made little men look big, and big women look small, which always pleased them.

Business was then resumed. Mr. Elliott presented his proposed amendment to the constitution in regard to the appointment of committees in accordance with their past usages, which had been decided unconstitutional.

Mr. Bogardus having been nominated for the office of President, which he has held for six years, peremptorily declined it.

The Convention then adjourned.

(To be concluded in our next.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 7	Edinburgh	The Hall, 5, St. Andrew-square.
„ 8	South London	John-street, Adelphi.
„ 8	Manchester (Annual Meeting)	Memorial Hall, Albert-square.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The last out-door meeting of the season took place on Friday last, the 25th ult., when the members, taking advantage of the newly-opened Balerno branch line, spent the day in the beautiful Curry Glen. There is no other city with which we are acquainted that contains, within a circle of ten miles, so much food for the camera, and the construction of this railway has opened up one more exceedingly beautiful locality. The new line branches off the Caledonian a little beyond Slateford, and, after crossing the Edinburgh and Glasgow canal, runs close by the water of Leith, which it crosses and recrosses nearly a score of times, through a continuation of most picturesque and varied bits of landscape, including numerous waterfalls, fine bridges (both old and new), quaint old mills with sleepy-looking caulds, reflecting in all its beauty the autumn-tinted foliage which gives such a charm to the tree-clad country at the present time, and, though last not least, many of the cosy-looking thatched cottages now so fast disappearing from the scene. We would advise those who intend to visit and photograph this beautiful glen to go by rail to Balerno, and then walk back along the line; and can assure them that, if they get a favourable day and have a couple of dozen reliable dry plates, they may easily bring home a couple of dozen excellent pictures.

In connection with the excursion the two Secretaries, accompanied by two friends, proceeded on a prospecting trip on the previous Tuesday, and acting on their advice the party got out at Colinton, intending to work their way up to Curry. The first picture lay at the opposite end of the tunnel, which is close to the station, and through which they had just passed; but the obliging station-master not only gave the necessary permission, but kindly furnished them with a lamp to guide their footsteps along the somewhat uneven path. On emerging from the darkness of the tunnel the view which confronted them was really grand—a miniature Killiecrankie, in fact, possessing the advantage of being easily included in one picture, and consisting of two charming foliage-covered hills, the various tints of the foliage being admirably rendered by unclouded sunshine, and undisturbed by a breath of wind; while through the valley ran, or rather tumbled, a river in numerous little falls, the white spray from which glittered in the light like diamonds. Here the cameras were unpacked, and in a short time all were at work. In consequence of many of the members being absent from town there were fewer than the usual number present; but it was noticed, as a somewhat unusual fact, that everyone present had a camera, and also that all the plates were by the beer and albumen modification. Although the light was good there was one side of the valley in shade, and in consequence rather long exposures had to be given.

The next halt was made at a point immediately in front of the station, where there was an old willow tree overhanging a deep pool, which, with its surroundings, formed too great a temptation to be passed without an attempt to transfer it to the collodion film. This was accordingly done, and again the party were on the move. In this way the journey to Curry was made amidst such fun and enjoyment as, we believe, can only be realised by votaries of the camera.

By the time Curry was reached the sun had gone down; but there were two pictures which all were anxious to secure—a group of thatched-roofed, rose-clad cottages, and a fine combination of an old tower, a bridge, and a ruined cottage. The former received forty minutes' exposure, and the latter a whole hour, in consequence of the paucity of the light.

The cameras were then packed up, and an adjournment to the hotel made, where Mr. Mackenzie had ready the usual wind-up—a tea dinner—to which, of course, full justice was done.

After removal of the cloth the chair was, in the absence of the President, taken by Dr. John Nicol; and the usual formal business was transacted, by which time the hour for returning had arrived, and the party started on the homeward journey, showering blessings on the head of the Caledonian Railway Company for opening up such a rich field of glorious work for the landscapist, and resolving to return to the ground at the earliest opportunity.

We are told that out of the whole day's work there were only three failures.

Correspondence.

MISUNDERSTANDINGS.—M. VIDAL'S PROCESS.

To the Editors.

Gentlemen,—I beg leave to relate, for the special edification of Mr. W. B. Bolton and Mr. P. le Neve Foster, the following little anecdote of Major Russell:—

During some conversation which I once had with our gallant friend, whilst on a visit to him at Stubbers, he alluded to the frequency with which writers in the photographic journals misunderstood each other, and said that he never sat down to answer any man's letter or article in print without having it before him to refer to, and first reading it over carefully.

Now, if Mr. Bolton had done me the honour to treat my recent articles on the latent image thus conscientiously, he could not have failed to discover that I have asserted many times that when pure bromide of silver is exposed to light under water the result is the grey sub-bromide of silver, and not the oxybromide, as he seems to think that I meant. The oxybromide is obtained when organic matter is present, and the exposure very short, as in the case of a camera image.

And if Mr. P. le Neve Foster had done me the honour to read, instead of to skim, what I have said at various times about M. Vidal's process, *in very carefully-considered sentences*, he could not, I think, accuse me of undue enthusiasm with respect to that method. I have never said I had great hopes of it myself; and the most that I have said respecting his specimens was that the early ones were promising, and the *last* one which I have received, but have not forwarded to London to be exhibited, as perfect as could be desired.

No one knows better than Mr. Foster, from his long connection with inventors and inventions, how frequently the most unpromising things turn up trumps; and I conjure him not to throw any unnecessary obstacle, in the way of adverse criticism, upon the labours of a most indefatigable and thoroughly practical man, who is devoting all his energies to the working-out of a new process which is no more wrong in theory than common chromolithography. We ought all to be grateful to M. Vidal for spending so much time and money in trying experimentally what can be done in this new direction of photochromy, instead of being hard upon his first results. Suppose an amateur like himself had conceived the idea of copying fine water-colour paintings by the first masters by such a process as chromolithography, what chance would he have had, with his limited resources, of producing works which would compare for a moment with the originals? And yet what capital results are *now* obtained by that perfected method!

My own maxim is—Never to write up a thing which *is* palpably wrong in principle; and never to decry a thing which is not wrong, merely because it may require years of persevering labour to bring it to practical perfection. Besides, may we not ourselves be mistaken in our ideas of what *is* right or wrong in theory? Carbon printing was at first *proved* to be wrong in principle by some people because the particles could never be ground fine enough by mechanical means; and yet look at the perfection at which that process has now arrived!

When an enthusiastic and clever *practical* man devotes his best energies to working out any crotchet of his own our policy is to leave him alone and watch the result, encouraging him so far as we conscientiously can. Then, whether he succeed or not, we gain wisdom by his experience, and are able to mount upon his shoulders and take a wider view. It is for this reason that my tendencies are towards the *encouragement* of anything new. Discouragement will sometimes stop altogether some men's career, whilst it will render other men selfish and secretive.

And now a word or two on another subject. One of our staff, who contributes to the *Foreign Notes and News* in this Journal, is afraid that my modesty may have been sorely tempted by the sugared remarks of M. Vidal at the recent meeting of the Photographic Society of Marseilles respecting my own long series of experiments with the bromide process. But really this was not the case. On the contrary, I felt hurt that full justice had not been done to me, for M. Vidal alluded to my moist bromide plates as being only as sensitive as common wet plates, whereas I have found them many times more sensitive. This, I feel sure, will be generally admitted some day, for the truth cannot always lie hid. We have in this process, in my own humble opinion, one far better than that in common use. But it requires steady perseverance to succeed perfectly with the manipulation, as it does with every other new thing. I have just heard from a leading professional portraitist in Algiers that he has at length succeeded with my bromised collodion (eleven grains cadmium bromide to the ounce, and an eighty-grain bath, with strong alkaline developer) in obtaining "*des résultats surprenants?*"—I am, yours, &c.,

September 25, 1874. Thomas Sutton, B.A.

"MR. DUNMORE'S ACID DEVELOPER."

To the Editors.

Gentlemen,—In reply to Mr. Winstanley's remarks in your last issue as to want of evidence, &c., allow me to say that I stated the kind of development I found gave the best results, and that was compounded with a large proportion of acetic acid and other substances that acted in a mechanical rather than a chemical manner. I lay claim to no novelty, as similar developers have been used by many, and my identical formula by professional and amateur photographers of high repute, who have been delighted with it—evidence valuable, although unprinted. When I have completed a few experiments connected therewith I will shortly publish it *in extenso* for the benefit of those whom it may concern, and Mr. Winstanley amongst the number.

I would suggest that experimentalists should turn their attention to the use of isinglass, albumen, jelly of the *cetraria Islandica*, and similar substances for developing, used with a *large proportion* of acetic acid; for, although I am perfectly satisfied with my formula, I see no reason why some other combinations may not give as good results.—I am, yours, &c., Edward Dunmore.

September 28, 1874.

KENNETT'S GELATINO-PELLICLE.

To the Editors.

Gentlemen,—As I see experience with this material has been asked for, I have much pleasure in giving mine.

My first attempts with it were not successful, but my failures seem to have arisen from not adhering so strictly to the directions as I ought to have done. Lately I have thoroughly succeeded, and can speak in high praise of it. It is extremely rapid, and over-exposure needs to be guarded against. Three to five seconds, with a Ross's rapid symmetrical and No. 3 stop, are ample for a fairly-lighted landscape at this time of year. Portraits in the open air with a portrait lens are almost instantaneous. The negatives are of good quality and the development is rapid. The process simply requires close adherence to the directions given for strength of developer, &c., &c. As the film is very sensitive, the light in the dark room, both for preparation of the plates as well as for developing, must be kept very subdued. If careful attention to details be given success is certain.

I strongly recommend it to the consideration of amateurs.—I am, yours, &c., P. le Neve Foster.

September 29, 1874.

FUMING PAPER.

To the Editors.

Gentlemen,—In an article in your Journal of the 18th ultimo you remark that, knowing the great advantages of fuming the paper, you are surprised that it is not more universally adopted, and for the three following reasons:—1. That paper prepared on a thirty-grain nitrate bath and fumed is better than paper sensitised on a sixty-grain bath and unfumed. 2. That fumed paper prints in half the time. 3. That prints on fumed paper possess a brilliancy and a richness unobtainable on unfumed paper. The first and last of these conclusions do not agree with my experience of fumigated paper.

During the winters of 1865 and 1866 I continually fumed the paper; not from a desire to economise silver or expecting better results thereby, but simply for the second advantage named (which I do not wish to dispute), namely, the time saved in printing during the winter months. The mode of fuming adopted was to hang the sheets up in a drying-closet, and on the ground was placed in a saucer about one ounce of ammonia. From ten minutes to half-an-hour was the time allowed. The silver bath was always kept up to forty grains' strength, and, although the prints were easily toned and of a pleasing colour, yet I must confess I prefer paper *unfumed*, for the following reasons:—1. The prints have more depth. 2. The shadows are not so easily bronzed (a very general complaint with fumed paper). 3. There is greater control over both the printing and toning operations. 4. The brilliancy and richness of the prints are of a more permanent character than that obtained by fumed paper—this latter being, in my mind, a most important advantage. I simply state these facts so that the subject may be more thoroughly investigated.—I am, yours, &c., Geo. Hooper.

September 29, 1874.

A Photographer's Disputed Account.—At the Westminster County Court, on Tuesday last, the case of Caldesi *v.* Gordon was heard before the presiding judge, F. Bayley, Esq., in which the plaintiff, a photographer carrying on business in Pall Mall, sued the defendant, a lady residing at Warwick-street, Pimlico, to recover the sum of £11 under the following circumstances:—It appeared that the defendant sat for an ordinary *carte de visite*, which she afterwards saw enlarged through the lantern, and it was suggested that she should have an enlargement in oil; to which proposition the defendant replied that, as she was furnishing her house, till that was done she could not entertain the matter. The plaintiff ultimately enlarged and had the picture painted and sent to the defendant's residence, when she returned it; and, as she had refused either to accept or pay for the picture, the present action was brought to recover the sum sued for. The defendant, through her solicitor, Mr. Popham, denied having given the order, and that it was contingent upon her having time when her house was completed that she should sit for the portrait in question, not having done so she disputed the claim. The learned judge thought that the plaintiff had failed to establish his case, and directed a nonsuit, which was entered accordingly.

EXCHANGE COLUMN.

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

I will exchange a quarter-plate lens, a half-plate lens, and two cameras to suit, for a rapid rectilinear lens or a magic lantern.—Address, James Denton, 70, Sheffield-road, Barnsley, Yorkshire.

A camera for stereos. on $6\frac{1}{2} \times 4\frac{1}{4}$, or pictures on full size of plate, screw movement, one single and three double dark slides, very little used, will be given in exchange for a No. 1 B long *carte* lens, by Dallmeyer; or offers.—Address, Geo. Bromley, Soho Cutlery Works, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

Thomas Bowen.—See reply to A. W. Beer.

J. J. Atkinson.—Thanks for kind attention.

A. W. Beer.—See answer headed "Sal Soda."

W. M. Stewart.—On returning the journal the mistake will be rectified.

Constant Reader.—Slate is a much better material of which to construct a washing trough than japanned iron.

Saturn.—In your experiments with the protosalts of iron bear in mind that, while oxalic acid produces a yellow precipitate after some time, the alkaline oxalates produce the same effect immediately.

Alpha.—You may consider yourself very well off if you obtain half the original price paid for the lenses. Remember that dealers may frequently have to keep such articles in stock for months, if not years.

Juvenis.—The picture is one of the kind known as "alabastrine." It is a collodion positive which has been subjected to the bleaching action of bichloride of mercury. We have returned the picture as directed.

S. S Crewdson (Ulverston).—Our correspondent would be glad if any brother photographer would recommend to him a gas stove that has proved satisfactory in a studio of moderate dimensions—say 24×14 feet.

Myosotis.—We shall try the experiment with the iron developer, and report. Thanks for the enclosures. Concerning the subject of one of these we have several times made inquiry, but without receiving a satisfactory reply.

V. T.—Unless you possess some practical knowledge of lithography the chances of your succeeding in producing satisfactory prints by the collotypic process are very small. If you desire to achieve success apply to some competent teacher, and obtain a few lessons.

R. L. O.—It is quite illegal to copy one of the pictures in the large group and publish it as a special production. "As the greater includes the less," and as that greater has been protected by registration at Stationers' Hall, it follows that all or any of the details are also protected.

W. T. E.—To test the liquid chemically for the presence of methyl would, we suspect, be far beyond your powers. However, try the following:—Pour into the palm of your hand some of the suspected liquor, and then allow it to evaporate. After evaporation, on smelling the hands the offensive methylic odour will be plainly perceptible.

Sal Soda.—Some correspondents have been asking what is the "sal soda," to which reference was made by Mr. Hearn in the extract we last week gave from the formula for a toning bath described in his practical work on printing. So far as we know or can ascertain "sal soda" is merely an American synonym for carbonate of soda, or washing soda, as distinguished from bicarbonate of soda.

Mills.—To obtain a knowledge of the history of photography read Hunt's treatise on *Photography*, which forms one of the volumes in the *Encyclopædia Metropolitana* (London: Griffin); the introduction to Halleur's *Art of Photography* (Weale's treatise); or our Almanac for 1866 *(Condensed History of Pre-Journalistic Photography)*, page 102, *et. seq.* The last-named will probably suit your purpose best.

X. Y. Z.—If your invention be but one-half as good as you describe it to be it is a proper subject for a patent. You do not appear to understand properly the difference between subjects suitable for protection by "registration" and "patenting." The former has reference to forms which can be drawn upon paper—designs or drawings; the latter to articles which exist in parts which can be put together. Every description of mechanism comes under the "patent" category, and of this kind is a camera. You could register any ornamental design which you might think proper to attach to the side or front of the camera by way of *ornamentation*, but the camera itself would have to be patented.

On the Use of Photographic and Chemical Apparatus.—The second of Mr. G. Watmough Webster's series of articles on this subject has been received, and will be given next week.

Dan.—Your failure appears almost unaccountable. As your apparatus and chemicals are all right we are somewhat reluctantly compelled to hint that the fault must lie in yourself. Do you really mean to say that you kept pouring the developer over the plate until you applied more than a quart of it without the image coming out? A quart of developer to a quarter plate! Try again. Give a short exposure, apply only so much developer as is required to flow over the surface, and keep the plate level.

C. B. P.—By the Fothergill process results of the most charming kind may be obtained; but it is so far from being a rapid process that it is, in reality, one of the slowest that is practised. The most rapid dry plates that can be procured are those in which gelatine takes the place of collodion as a vehicle for holding the bromide of silver. Observe that we are speaking of rapidity alone, without reference to quality. We do not, however, say that very fine results cannot be got by gelatine, for we know that such results *have* been obtained.

B. J. (Bayswater).—You have been correctly informed. Before being allowed to sell jewellery in the form of lockets, or indeed in any other form, in silver and gold, it is necessary to pay the plate license of £2 6s., which covers the transactions of the whole year. For selling gold-*plated* lockets, brooches, or pins the above license will not be required. To fit portraits into jewellery of this kind try the effect of producing them on ferrotype plates—a name which has, during the last ten years, been diverted from its original signification to mean the medium upon which the picture is taken.

"J. S. H."—An answer which appeared attached to these initials in our last number has elicited disclaimers from two correspondents. Mr. J. S. Hardy, of Islington, whom we have at former periods "answered" both under his own name and his initials, as well as Mr. J. S. Hailes, of Blandford, are desirous that their names should not be associated with the person who "put in an appearance" in our last. Those who are acquainted with the gentlemen just named will know that it was impossible either of them could have been guilty of the meanness attributed to our correspondent of last week, whose address, we may state, lies in an entirely different part of the country from those of the two other correspondents to whom we have referred.

Received.—Rouch and Co.; B. J. Edwards; H. Blackburn; J. Pollit. These in our next.

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

His-story Repeating Itself.—The Camera men on the field of Collodion!!!—*The Bailie.*

Crawshay Competition, 1874.—Mr. R. J. Friswell, Hon. Sec. of the London Photographic Society, has issued the following notice, dated Sept. 28th:—"In accordance with a notification received this day from Mr. Crawshay, the size of heads for prizes 3 and 4 should be $4\frac{1}{2}$ inches, instead of $5\frac{1}{2}$ inches, as stated in the circular of the 19th instant."

South London Photographic Society.—This Society will commence its winter session on Thursday, the 15th inst., with a Technical Exhibition, similar to those so successfully held during the last two years. Further particulars will be given next week. In the meantime intending exhibitors will please communicate with the Hon. Sec., Mr. Edwin Cocking, 57, Queen's Road, Peckham.

METEOROLOGICAL REPORT,

For two Weeks ending September 30, 1874.

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

These Observations are Taken at 8.30 a.m.

Sept.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
17	29·98	NW	51	53	60	49	Dull
18	30·01	W	51	56	65	42	Cloudy
19	30·13	W	50	54	70	43	Dull
21	29·71	S	60	62	70	54	Fine
22	29·89	SW	55	60	67	51	Fine
23	30·04	E	55	57	—	49	Dull
24	30·20	WNW	55	55	69	49	Dull
25	30·32	W	57	59	80	51	Fine
26	30·27	W	57	61	75	52	Dull
28	29·96	W	60	61	70	54	Dull
29	29·79	W	56	60	69	55	Cloudy
30	29·91	SW	62	54	—	49	Raining

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THE BRITISH
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BOOK ILLUSTRATION BY PHOTOGRAPHIC AGENCY.

The perusal of Mr. Geiger's work, *A Peep at Mexico*—a review of which will be found in another page—suggests some observations on the subject of the illustrations of books of travel by means of photography.

As all gifts are not usually found centered in one individual, it happens frequently that travellers of the greatest enterprise and intelligence, who are able to use the pen in the most facile manner in illustrating vivid word paintings by the various scenes they encounter, are quite unable to use either the pencil or the brush so as to attempt anything like an artistic pictorial delineation of any of these scenes. As, however, pictorial representation was frequently rendered necessary, Mr. Geiger had recourse to the camera-lucida and the drawing camera-obscura (an instrument now but little known), and by their agency the traveller could see projected upon a sheet of paper suitably stretched on a portable table before him a view of the place he intended to secure, all that was necessary being the careful tracery by pencil of the scene thus depicted upon his paper.

Not a word would we desire to breathe against such instruments, which we know have often been and, doubtless, still will be productive of the greatest possible service in delineating a view, for that both of them answer the purpose intended we know full well, having often used them. But they fall far short as compared with photography. Much skill, care, and time are required in drawing the images thrown upon the paper by the cameras lucida or obscura, and, at best, all that is usually obtained is an outline of the various objects in the scene—accurate enough, certainly, but quite wanting in details, the artist being supposed to fill in these during his leisure hours. By using, on the other hand, the photographic camera not even the most elementary skill in drawing is required; while such is the abbreviation of time that six negatives may easily be taken of scenes in one neighbourhood during the time the camera-lucida artist is engaged upon one such view.

The tourist who adopts photography as his handmaid usually desires that she shall be brought to him by a royal road from which all difficulties shall have been removed. The applications of photography to general science may possess some interest for him, but that interest is feeble in comparison with its applications to topography. To meet his requirements apparatus combining the maximum of portability and efficiency have been invented. And such, altogether, is the mechanical state to which photography has for his requirements been reduced, that almost all that remains for him to do is to take one out of the large supply of sensitive dry plates he is assumed to have with him for the purposes of his travels, and expose it to the view selected by him for the "regulation number" of seconds or minutes, subject to such modifications as are demanded by the nature of the subjects and the state of the light; developing the impressions thus obtained either at the end of the day, or week, or on his return home from his tour. During his journeyings the traveller should not be hampered or harassed by any cares of a photo-technical kind, but should feel that every scene to which he points the lens of his camera will eventually be represented by a negative faithfully recalling the most minute object upon which his eye has rested; and thus being free from anticipated ulterior cares his whole attention and care is concentrated upon the selection and composition of the picture to be taken.

As tourists who journey with the intention of publishing descriptive details of their travels are not necessarily skilful photographers, it is only to be expected that many of their negatives may turn out either too thin, too dirty, or too much over- or under-exposed to enable them to be used in the printing of direct views. Under these circumstances it is desirable it should be generally known that for book illustration a method may be employed by which the drawing and general details of the photograph may be secured without any of its defects. This method we shall now describe.

Many years have elapsed since it was suggested by a gentleman, now on the staff of this Journal, that an excellent mode by which to utilise for the purposes of book illustration photographs too imperfect to be printed in the usual manner was to make pen tracings from them in lithographic transfer ink. For this purpose a sheet of tracing-paper is attached to the print in such a way as to prevent it slipping, and a competent artist then makes a careful tracing with a fine pen of all those features in the picture which it is desirable should be secured, all the defective portions being, of course, omitted. The drawing thus obtained is transferred to the stone, and the lithographic printer then takes as many impressions as may be required. We have an excellent drawing made, in the manner described, by Messrs. W. and A. K. Johnson, of Edinburgh, from a photograph which, owing to some defects the nature of which we cannot now remember, could not otherwise be utilised.

On the process just described we have, during the past twelve years, made several modifications, which we have carried out in practice, and some of which are very great departures from the original method. With the view of proving an incentive to those of our readers who are connected with or interested in the preparation of photographic views for publishers of books of travel, or other illustrations of a similar character, we shall indicate a few of the changes which have been rung, and that with so much success as to lead to their adoption in some instances in works of which very large editions have been printed.

a.—Let an ordinary silver print be obtained upon a sheet of suitably-prepared paper; then go over the picture with a lithographic pen charged with transfer-ink, when the drawing may at once be laid upon the stone and printed from. This simplifies the original process to a slight extent.

b.—Instead of the transfer-ink in the preceding case use a slight-bodied ink containing bichromate of potash and a hygroscopic material, and transfer or, rather, "set-off" upon a plain gelatinised surface on glass, stone, or metal, from which, after exposure to light for a short period, impressions may be taken in the same manner as practised in *lichtdruck*.

c.—Make the drawing in transfer-ink; "set it off" upon a polished zinc plate, then etch the plate to a sufficient depth to permit of its being printed along with type. This can be easily done, as there are now processes of etching by which *any* degree of depth may be obtained without the slightest fear of under-cutting. This modification ought to prove of very great commercial value, seeing that the photographic etching, which is really a surface block, may be embedded among the type and printed with all that rapidity so well known to belong to typographic processes of printing as distinguished from copperplate or lithographic printing. We are aware of twenty-four thousand impressions having been obtained from a block prepared in the manner here indicated.

d.—Print the photograph on white paper in a blue tint, by employing one or other of several ferrotype processes we described in this Journal in some of our numbers for February last; then trace the subject with any kind of black ink. Take a negative of the required size, and from this produce either a surface block or a lithographic transfer, according to the method of printing to be employed.

From these hints, necessarily presented in a skeleton form, it will be seen that in the preparation of illustrations for works of travel photographs may be easily rendered serviceable, even although they may be blemished to such an extent as to render them unsuited as pictorial representations in their original condition.

THE AMMONIA-NITRATE OF SILVER BATH.

We think a few words on the use of the ammonia-nitrate of silver bath for sensitising paper may form a somewhat useful sequel to our recent articles on fuming and the *rationale* thereof. We know that at the present time there is much more attention given to the process of printing than formerly; but an examination of any average collection of miscellaneous photographs will furnish abundant evidence that there are still many who think that all their care and attention should be given to the production of the negative, and that the mere mechanical printing may be trusted to anybody. It is, doubtless, true that the first requisite is a good negative; but it is as undisputable a fact that much more than a mere mechanic is required to bring out in printing the full qualities of such a negative.

The production of a first-class print is the result of a happy union of the mechanical and the chemical elements, and can only be achieved by those who, having a thorough appreciation of the importance of their work, make every separate negative an object of study, and consider no necessary time misspent in the attainment of the desired goal. Without in the least degree undervaluing the importance of the many mechanical dodges which the experienced printer is able to bring to bear on his work, we have no hesitation in saying that he never can give too much attention to the colour and brilliancy of the finished print, and it is this colour and brilliancy that we especially have in view in the present article.

From a very extensive series of experiments, as well as from the opinions of many who regularly fume their paper, we are satisfied that by the use of ammonia both time and silver may be largely saved; and we are equally certain that we somewhat understate the matter in simply saying that the prints so produced are at least equal in every good quality to those made with a larger expenditure of both, but without the fuming. It is, however, no doubt true that there are many operators who, for various reasons, will not take kindly to fuming their paper. Some are afraid of the effect of the ammonia on the material in the laboratory; others think that they have not sufficient convenience in the limited accommodation at their disposal; while several with whom we are acquainted have given it up after a very imperfect trial, forgetting that even such a simple operation requires for its proper management a little experience. To all such we would recommend a trial of the ammonia-nitrate bath, which may possibly be found to give all the advantages of the fuming without any of its actual or supposed faults.

Those of our readers whose memory extends to the times before the introduction of albumenised paper will remember the beautiful, velvety tones produced on plain paper by the use of the ammonia-nitrate of silver, and the many, but generally unsuccessful, attempts that were made to apply it to the albumenised surface—attempts which generally resulted in the solution of the albumen, in consequence of its not being coagulable by the ammonia-nitrate. This difficulty, however, seems to be obviated by the addition of alcohol to the bath; and, if we may judge from such experiments as we have made, we think all the advantages of fuming, and several others besides, may be found in the use of the ammonia-nitrate solution.

Our attention was recently directed to the subject by the examination of a series of fine pictures shown to us by Mr. Henderson, of Montreal, during a recent visit. In addition to high pictorial qualities they possessed, in a high degree, the rich, brilliant, warm, purple-brown colour so generally admired, with a depth not often seen except on very highly-glazed surfaces. On inquiring into the method of their production he stated that he had used an ammonia-nitrate bath, containing from twenty to twenty-five per cent. of alcohol, for many years, and had found it to answer his purpose so well that he was not likely to change it for any other; for, he said that, in addition to the brilliant, beautiful tones which it enabled him to produce, it possessed many other valuable qualities. For example: he found the coagulation of the albumen to be so complete that, although the bath was in almost constant use from January to December, it remained perfectly colourless, and so he was saved the necessity of repeated filtrations, decolouration by kaolin, &c.—that, in fact, the bath at present in use in his establishment was at least six years old, and that it was kept in perfect order by the simple addition, from time to time as it became low, of a little freshly-made ammonia-nitrate and alcohol.

Acting on his suggestion we tried the following experiment:—We dissolved 800 grains of nitrate of silver in ten ounces of water, and then added carefully, especially towards the close of the operation, sufficient dilute ammonia—a mixture of one part of stronger ammonia and two parts of water—to dissolve the precipitate at first thrown down. The solution, which now contained a little over seventy grains to the ounce, was brushed over a piece of albumenised paper; but in a short time the surface got dull, and it was evident that the albumen was becoming dissolved, and to such an extent was this the case that an attempt to produce a print on it resulted in the production of a patchy, irregular surface, utterly useless for all practical purposes. To the solution was then added five ounces of alcohol, s.g. 0·840, and the bulk made up with water to twenty ounces, so that the strength was forty grains per ounce. Paper floated on this for three minutes lost none of its brilliancy, and when exposed under a negative, along with two samples—one sensitised on a sixty-grain bath simply, and one on a thirty-five grain—and afterwards fumed, it was printed in quite a third less time than the first, and very nearly as quickly as the latter, while the tone was decidedly better than either. We have only sensitised three or four sheets as yet, and so cannot say much as to the tendency to remain colourless; but we shall use it regularly for some time and report the results.

The proposition to use alcohol in the sensitising bath has been often made, and as often discouraged on account of the fancied expense; but that objection has really little weight, as the additional cost is only about tenpence per pint, and even that may be reduced to twopence by the use of methylated spirit, although the organic impurities which it generally contains combine with the silver, producing slight discolouration, but not in any way affecting the result.

THE DISINTERMENT OF THE DAGUERREOTYPE PROCESS.

Our readers will find amongst this week's *Foreign Notes and News* some advice given to scientists by M. A. Cornu, in a communication of his to the French Committee of the Transit of Venus, to employ the daguerreotype in preference to the collodion process in the application of photography to astronomical purposes.

The subject of the reintroduction of the process of Daguerre for many purposes where the collodion process is now employed is well worthy of serious consideration; and we will venture in the present article to state as fairly as we are able the claims which that fine old method of taking a direct positive in the camera has to be disinterred from the oblivion into which it has been cast by its more artistic rival. There are two sides to every question, and we will endeavour in the present case to present them both fairly to the reader, commencing with the brighter one.

A daguerreotype is a direct positive taken upon a silver plate which has been polished to the highest degree of which mechanical art is capable, and which is excited by exposure to the impalpable fumes of iodine and bromine, the image being developed by the impalpable vapour of mercury. The plate is then placed in a bath of hyposulphite of soda, in order to remove the delicate film of bromo-iodide of silver which has not been acted on by light; and the image, which in this state might be easily rubbed off by the finger, is cemented to the plate, and beautified in appearance, by treating it with a hot solution of *sel d'or*. The picture is now finished, and can only be removed from the plate by friction with some strong chemical detergent.

The technical qualities of a good daguerreotype are, as might be expected from the very nature of the process, little short of perfection, and from this point of view the process is without a rival. Nothing can exceed the sharpness of the lines, the beauty of the gradations, and the legibility of the details in the deep shadows. In sensitiveness the plates are but little inferior to good wet collodion ones, whilst they have all the convenience of dry plates, inasmuch as they will keep for several hours between excitation and development. It only remains to add that daguerreotypes can be very easily and successfully copied, and collodion negatives taken from them by means of a copying camera. It is true that such negatives are reversed, but in this state they are suitable for the carbon printing process by single transfer or for collotypic printing. They may also be used for the Woodbury process or for printing glass transparencies. It is for common silver printing only that they will be unsuitable; but even for this they may be rendered quite suitable if taken by means of any of the now well-known methods of reversing the image. To the above list of advantages we may add one more, and it is not a slight one, viz., that a daguerreotype shows no blurring which can result from reflexion off the inner surface of a glass plate.

Now let us turn to the opposite side of the question. Has the process of Daguerre any practical disadvantages which might weigh with a man of science as a serious set-off to its obvious merits? In common fairness we are bound to answer this question in the affirmative. We must not mislead any of our readers by drawing a veil over some of its shortcomings; though amongst these we do not, of course, include the mere shimmer of the silver plate.

In the first place, then, the silver plate, however beautifully it may be polished, has never the perfect polish of a plate of glass; it shows the marks of the buff. There is also in the metal plate the common liability to minute holes and scratches.

In the next place, the time of exposure is a rather critical matter, and beautifully-prepared plates are often lost by unavoidable errors in this respect. Over-exposure may cause the lights to be deficient in delicate gradation, or even to be solarised; whilst under-exposure will leave the shadows devoid of detail. The exact mean, it must be confessed, is difficult to hit in this process.

Such are the chief drawbacks. With respect to difficulties of manipulation, these occur in sufficient abundance in all photographic operations, and the daguerreotype process is by no means free from them. The colour of the plate, after treatment with the iodine and bromine fumes, may be uneven in different parts; the mercury may be over-heated; stains may occur in the hypo. bath; and black spots may be produced in gilding, &c. But the process has this advantage, viz., that if an accident should happen to a sensitive plate during exposure it need not be cleaned and coated again, but may be restored by simply submitting it for a few seconds to the fumes of iodine.

On a future occasion we may, perhaps, give a sketch of what would be a suitable outfit for an amateur tourist taking ordinary views by this process with a pocket camera for quarter-plates; meantime we would observe that the possibility of taking views in this way is no fiction. We have still a lively recollection of a series of most charming views of Florence and neighbourhood, taken some years ago by a professional photographer in that city upon daguerreotype plates, and which left nothing to desire in point of technical excellence. They were upon half-plates, and collodion negatives of any size, larger or smaller, could have been successfully taken from them. The whole travelling outfit for quarter-plates would be a very simple matter indeed; and from these might be taken collodion negatives of artistic subjects, enlarged up to 12 × 10, with perfect success.

We venture to add that with proper instruction any skilful photographer could learn the daguerreotype process in a week. It surely holds out some advantages, and it is worth considering whether we are acting wisely in completely turning our backs upon it.

PRACTICAL NOTES ON THE SAVING AND REDUCING OF RESIDUES.

CHAP. VI.—UTILISING THE RECOVERED METAL.

These notes have extended to a greater length than I anticipated when I commenced them, but one or two points still remain to be considered, among them being the mode of disposing of the metal recovered.

There are two methods open to us—one to convert the silver into nitrate by dissolving it in nitric acid, when the gold will be left behind to be converted into the chloride; the other to sell it by assay to the refiner or bullion dealer. We must decide which method we shall adopt before the furnace is allowed to go out, as the metal will require re-melting to get it into a convenient form to be acted upon by the acid if made into nitrate, or into one mass if it is to be sold, otherwise a separate assay will be required for each piece to determine its value.

The metal to be melted should be placed in a plumbago crucible, familiarly known as a "blacklead pot," which is to be placed in the fire with the precautions given in a previous note to prevent its cracking. When the metal has assumed the liquid form—which will not require nearly so much heat as it did for its reduction—the pot should be firmly grasped with the tongs, and the contents (if it have been determined to convert it into nitrate) poured in as fine a stream as possible into a vessel of cold water, holding the crucible about two or three feet above the surface of the water; this will granulate it, by which means it can be more easily acted upon by the acid. A glazed earthen vessel is preferable for this purpose, as the metal is more easily collected than when a wooden one is used.

If it is to be sold the contents of the pot should be poured into an ingot mould. These moulds are made of iron, and may be purchased at small cost at most jewellers' material dealers. The crucible will serve many times when used for melting only.

I will not take up space by describing how nitrate of silver is made, as that is well known to all photographers. I might add a precaution to be observed by those who make nitrate of silver for the first time. They will find that as the solution gets nearly saturated, unless great care be taken, large bubbles will be formed at the bottom of the flask, which will throw the solution up with great violence—an action commonly known as "bumping." Sometimes the force is so great that the bottom of the flask will be broken and the contents spilled. To obviate this the refiner adds several lumps of charcoal; but as this addition causes a great amount of impurity in the nitrate of silver it should be avoided by the photographer, who should adopt the precaution of adding some pieces of broken china, or of keeping the flask agitated during the boiling. I may add that any metal remaining undissolved by the nitric acid is gold, and should be added to the gold residues, or, if in sufficient quantity to make it worth the trouble to treat it separately, it should, after washing to free it from silver, be made into chloride. I do not consider the conversion of the silver into nitrate to be the most profitable step for the photographer to take, as it can at all times be purchased at a price *very* little over the value of the metal contained in it, nitrate of silver being itself a by-product in the operation of separating, or "parting," gold from silver, which can only be effected by dissolving the silver out with nitric acid. This solution, on evaporation, produces the nitrate of silver of commerce, the demand for which created by photography saves the refiner recovering the silver by a more expensive process.

I think it will be found more advantageous to convert it into cash. We are aware that in all transactions it is an advantage for the vendor to know the value of what he has to dispose of, and especially is this the case when the precious metals are concerned. I have heard several friends complain that their refiner had only given them so much per ounce for the silver he had recently recovered for them, whereas a year or two back he had given several pence per ounce more. They all assumed that the silver recovered from wastes was pure and always of the same value, whereas nothing can be more erroneous than this, as the silver recovered from residues varies considerably in purity and, consequently, in value; and, added to this, the market price of silver is continually fluctuating, being at the present time much lower than I have ever known it to be. Standard silver is now quoted at 57⅝d. per ounce; four or five years back it was worth 62d.

To arrive at the actual value of the metal an assay must be made, and for this purpose a small piece must be cut from the lump, or ingot, weighing not less than a pennyweight, and sent to an assay office, with instructions to make a *parting* assay. This will cost one shilling and sixpence, for which an assay note, together with the metal sent, will be returned, which will not only show the amount of fine silver present, but also the quantity of gold. A silver assay alone would only cost sixpence. This note will be accepted by the bullion dealer, or refiner, as conclusive of its quality; but when he purchases without an assay having been made he is almost as much in the dark as the seller as to its *actual* value, and is not likely to pay too much for it. An assay note is now before me which shows that the sample sent contains one pennyweight of gold, and eleven ounces, fourteen pennyweights, and twelve grains of silver in each pound troy. This quantity of gold is worth nearly four shillings and threepence, and is a larger proportion than generally exists in silver recovered from wastes, unless the toning residues have been added. It will also be seen that the silver is not quite pure, as each pound contains, besides the gold, four pennyweights and twelve grains of impurity.

To arrive at the value of the metal we have only to look at the money article in any of the daily papers for the price of bar silver—which is of the standard quality of this country, and contains 92·5 per cent. of fine silver and 7·5 per cent. of base metal, as alloy—and from this calculate, by the rule of proportion, the value of our sample. A rough-and-ready plan, which is nearly correct, is to add seven and a-half per cent. to the price quoted, and twopence for each grain of gold per ounce, deducting one penny for each eight grains of impurity per ounce. Some refiners will pay for the full quantity of gold, others will only pay for all over a certain quantity—say four or five grains to the pound; hence the advisability of keeping the gold residues separate, and not diffusing them through a large quantity of silver. Although we know the actual value of our metal, whether silver or gold, we must not expect the bullion dealer to give that amount, as he has to make a profit out of his purchase; but it will be found that he will pay within a penny or so per ounce of its value.

My next and concluding chapter will be devoted to a method by which the silver may be recovered as nitrate for future use without the aid of a furnace. E. W. Foxlee.

PRINTING-MOULDS.

Since I described my method of making moulds for relief printing with sealing wax, which was published in the Journal of September 11, I have been making more experiments, but this time with soft metal; not that I am dissatisfied with the results of the wax method, for I believe it to be quite equal to metal done in the hydraulic press. I have gained equally good results both with lead and lead mixed with a little type metal, by melting together and then rolling it out on the ordinary steel plate of the rolling-press to the eighth of an inch thick, and which seems to me to be the substance most suitable to make the moulds of.

The way I make these metal moulds is as follows:—I have a flat and true plate of steel, and round the edge I have rivetted an edging of steel a little thinner than the sheet of soft metal, so that pressure can be applied by passing it through the ordinary rolling-press. I take one of the soft metal plates, of the same size as the shallow steel box, and place it in it; then I lay the gelatine relief upon it. I next place over the gelatine relief another steel plate of about half-an-inch thick, which is also made true, adjust the press screws to give a suitable pressure, and finally run it through the press, which forces the gelatine relief into the soft metal in a manner equal to the more expensive hydraulic press. As it presses the mould tightly up to the steel edging it does not distort the picture in the least, which would be the case if the edging were not there. The metal mould will leave the box quite easily, because it is tapered on the inner edge, being wider at the top edge. I should have said that the steel plate used to roll the photographs upon must be removed, and the steel box placed upon the iron bed of the rolling press; then no damage will be done to the plate.

It is not an easy matter to make this great thickness of plates pass through the press at first; but to avoid this I place two iron or hard wood rods on the iron bed at each side, of such a thickness as to be a little thinner than the material to be carried through the press. These rods keep the top roll up to the proper height, so that it will bite at once.

By this method metal moulds may be made without the expensive and heavy hydraulic press, and the work is as well done.

I shall be in London in a short time, and will bring some moulds done both by the wax method and by the one I have just described, together with prints from them, and you can judge whether they are or are not as good as those done in the hydraulic press.

S. W. G.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

II.—Filters and Filtration.

The object of filtration is twofold or threefold—firstly, to render turbid liquids clear and transparent; secondly, to separate and collect suspended particles from the fluid that contains them; and, thirdly, to combine these operations when both the clear liquid and the suspended solid are needed separately. The methods of gaining the required ends are numerous; a few more useful ones only will here be treated of, the principle running through all being the same—the passing of the turbid fluid through some medium whose pores are smaller than the suspended particles, and consequently hold them back while they allow the fluid to pass through. The fluid passing through is generally known as the "filtrate," while the separated particles are usually called the "precipitate," or deposit.

The photographer in most cases will use the filter-paper and funnel; the latter is an utensil too well known to require description. Glass, earthenware, and gutta-percha are the only materials allowable for chemical purposes; glass ones, though objectionable on account of their great frangibility, being far more preferable, owing to the facility with which they can be cleaned, as well as the ease with which absence of cleanliness can be ascertained. Care should be taken that the tube or neck of the funnel is of the right length—neither too long nor too short; if the former it is difficult to clean, while in the latter case it is awkward to use. The filter-paper should first be folded so as to fit the sides of the funnel, and, as this can be done in several different ways, it will be as well to notice them at once. The most common method is to fold the paper so as to make it half its size, and afterwards double it again in the contrary direction; it can then be opened out in the shape of a cone, which is to be placed in the funnel, point down, so as to lie flat against the sides. Upon pouring the turbid fluid into the filter it will gradually pass through, slowly or quickly, according to the nature of the precipitate. The latter will be left behind upon the sides and at the point of the paper cone, while the filtrate will be clear and pellucid. When the precipitate is of a very fine nature it may be found necessary to perform the operation a second time to get a thoroughly bright and transparent filtrate, or the filter may be made of two thicknesses of paper with the same end in view. The precipitate of iodide of silver, made by diluting a strong solution in nitrate of silver, will always require two thicknesses.

There is a right and a wrong way of doing everything; the right way to fill a funnel from a bottle is to pour the fluid *gently*, carefully directing the stream against the side of the filter near the top. If it be absolutely necessary to save the filter from damage the solution should be poured slowly on to a glass rod held in a slanting position, with the lower end touching the paper, the lip of the bottle being in contact with the rod near the upper end. If this precaution be not attended to, and the fluid be roughly poured on to the middle of the filter, it is almost sure to burst it, and so render useless all the filtration already effected. Further: when an aqueous solution is to be filtered the filter-paper should always be wetted with distilled water before filling it with the solution.

When the filtration of a large bulk of fluid is required it will always be desirable to give it a little time to subside before pouring it into the filter. The operation will then be much facilitated and fewer changes of filters will be required; for, in the continuous filtration of a fluid containing much precipitate, particularly if of a glutinous nature (as, for instance, in the making of varnish), it will be found necessary to change the filter frequently, or the operation would be interminable. Varnish, when made in any quantity, is an instance where it is positively necessary to allow some *considerable* time to elapse for subsidence, and the upper part of the fluid should be carefully decanted from the deposit before filtering.

Very little need be said as to the paper itself. Cut into circular shapes of all sizes it may be purchased of good quality from any chemist or stock-dealer. Where there is choice a hard, tough sample should be selected; the finer sorts—thin and white—are only needed for analytical purposes, frequently to be burnt when weighing small precipitates which could not be scraped off. I may point out that the best qualities of paper in the larger sizes will be found among the circular filters, which have been made that shape in the process of manufacture at the mill, and not cut out of larger pieces of the ordinary square filtering-paper, some of which is of very coarse texture. The best circular ones may be known by a watermark, which consists of a number of lines radiating from the centre like the spokes of a wheel. I have never met with really bad paper with this mark.

When the filter is placed in the funnel as described it will attach itself so closely to the sides that no exit can be found for the fluid that would otherwise percolate through the sides of the paper, and, as this would form by far the larger proportion of surface, many methods have been devised to obviate this difficulty. One is in folding the filter to double it over a little further than usual in the second folding, and to roll up the projecting paper into a sort of tube, which thus forms a channel. Another and a better plan is to place glass rods between the paper and the funnel. The stream of fluid that will be seen coursing down by the sides of the rod will convince anyone of the necessity for some contrivance if rapid filtration be desired. The most effective way of using these will be to bend an end of each in the shape of a hook. They will then be supported in their place by this hook catching the rim of the funnel, while if the exact size of rod be selected the opposite ends may meet at one point, the end or tip of the filter-paper cone being thus afforded a support in its weakest part. These hooks will be alluded to again when the working of glass tubes is being treated.

Another method is making the funnel itself grooved after the fashion now adopted by nearly all makers. This, though almost universal, I consider of little or no use at all, as anyone may see for himself, the paper in a grooved funnel fitting practically as tightly as in a plain one. If the grooves were very deep (so much so as to make them difficult to clean) the grooving would be of advantage.

The most handy method of rapid filtration, and one requiring no special contrivance or appliance, is the plaited filter. This is made by doubling a paper as usual for the first fold, and then, instead of the second doubling, folding the piece like a *fan*, taking care not to press the creases as they near the centre of the paper, or what might be called the "fan-handle," as this would weaken it too much. This, when opened out, forms a sort of corrugated cone, the whole circumference consisting of alternate projections and recesses, forming a multitude of little channels for carrying off the liquid as it passes through.

All filters are liable to burst at the point, and this one particularly so. This disaster may be prevented by placing a little plug of tow or cotton-wool in the neck of the funnel, thus forming a bed for the point to rest upon. It will be obvious that the funnel will require some support while the filtering is taking place. The best plan is to have a funnel or retort-stand always at hand, and to place the funnel in one of its rings during the operation; it is then prevented from chipping the neck of the bottle when filtering out of one bottle into another, as is very commonly done, and is also less liable to be knocked over by accident. The retort-stand consists of a metal rod fixed in an upright position upon a firm base, and having rings of various sizes projecting from it able to be raised or lowered at will, and clamped into position by means of a screw. They can be bought of various sizes, and with as many rings as are required. Three rings will be found a useful number under most circumstances. The method commonly adopted is to place the funnel in the neck of the bottle intended to receive the filtrate. As the liquid filters in it drives the air out, and in doing so some portion of the fluid gets splashed about at the funnel point and is drawn up by the out-going current, running down the sides of the bottle, and generally making a great mess. Sometimes when the funnel-tube is short the greater part of the filtrate would be lost in this way if no means were provided to prevent it.

If the funnel fit at all tightly, especially if the mouth of the bottle be wet, the filtration will be entirely stopped, no liquid whatever passing into the bottle though the funnel may be quite full. This is owing to there being no egress for the air which the filtrate displaces, and may often give rise to the impression that the filter is clogged up. A piece of paper twisted a time or two and put between the funnel and the neck of the bottle will be all that is required to make all work smoothly. If, however, the liquid is being filtered into an open vessel—jar, beaker, &c.—the same precautions are not required; all that it is necessary to guard against being the splashing of the filtrate as it runs into the receiving-vessel. The splashes will be prevented if the end of the funnel reach a little way inside, and be so directed as just to touch the side; the fluid will then flow down and mix with the rest quietly and without splash.

Among the different forms of funnels may be noticed the *tube funnels*, long tubes opened at the end into a funnel shape, for conveying fluids into retorts, and for a variety of other purposes more especially required in laboratory use; the pierced funnels, which are of porcelain, shaped like an ordinary funnel, but without neck, and riddled all over with holes, used with cloth cones, for rapid filtration; and the French funnels, which are long and narrow, the side forming an angle of about 40°, while those of the ordinary English funnels are inclined to an angle of about 60°. In using these French ones the filter-paper requires special folding, the ordinary double-folded cone, which makes an angle of 60°, not being suitable; but the plaited filter before described answers admirably, and is one of the most efficient means possible for quick and effective filtration.

For very small quantities of solution filter-rings of porcelain, with arms to rest on the jar or test-glass, are made. They are used without funnels, the little filter-paper cone being inserted in the ring, which is quite enough support for a small cone of an inch or two diameter. The operator with few appliances can readily improvise a substitute by threading four or five short pieces of tobacco-pipe on to a piece of wire and twisting it into a ring; it will answer all requirements, though its form will not be quite circular.

It will often be found convenient, where large quantities of fluid have to be acted upon, to have some means of automatically supplying the filter without that necessity for constant attention which the continual filling of the funnel as it empties itself requires. The celebrated chemist Berzelius suggested a very neat way of doing this many years ago. First filling the funnel within a little way from the top, he inverted a wide-mouthed bottle containing the fluid to be filtered immediately over the funnel and its contents, with its mouth dipping just below the surface. So long as the liquid in the funnel was above the level of the mouth the pressure of the atmosphere would prevent any of the contents of the bottle from escaping. The moment, however, through the gradual diminution of its bulk, the surface of the fluid fell below the bottle's mouth a bubble of air would enter, followed by the escape of some of the contents. This would again raise the level of the fluid in the funnel, and act as a stopper to the bottle; and so the alternate opening and closing the mouth of the bottle would continue till all its contents had passed into the filter. The bottle will be apt to move as its contents bubble out, and care must be taken to fix it securely. The retort-stand comes in conveniently here; a lower ring holds the funnel, while one of the upper ones holds the bottle mouth downwards, and very little ingenuity will be needed to devise a method of fastening the bottle to the pillar of the stand.

In filtering precipitates from photographic waste, even in moderately-sized establishments, very large filters are required. The plan I adopt is to get a piece of calico sewn into the shape of a funnel or cone, with an angle of 60° (remembering that the calico will require to be only half the size of a paper filter); all round the top of this is roughly stitched a piece of cane or a green twig, bent into a circular shape. A whole sheet of filter paper, doubled into a cone and put into this calico bag, forms a complete filter, which will hold many pounds of chloride or sulphide of silver. It is suspended over the sink by means of four flat pieces of wood about an inch wide, which are nailed together into a square with a little smaller aperture than the diameter of the cone or filter. When not in use the *washed* filter and the wood support may hang against the wall, occupying scarcely any space.

The use of paper and funnel offers to photographers many advantages, not the least of which is the ease and cheapness with which a new filter is at once put together—a matter of great importance in any chemical operation, as the slightest contamination of one chemical with another is quite sufficient to render nugatory the most carefully-conducted experiment. Besides woven fabrics of woollen, linen, or cotton—each possessing advantages of its own for certain purposes—filters can be made of cotton-wool, asbestos, or tow, and also of sand, powdered glass, charcoal, &c. Cotton-wool is used by placing a plug of it, moistened with the fluid to be filtered, in the neck of the funnel; but it is very liable to tighten itself and stop the action of the filter. I very much prefer well-carded and cleaned tow; it filters quite as well as the wool, and is not nearly so liable to tighten, and, further, it is much cheaper. Neither of these, however, leave the filtrate so bright as paper does; but for such purposes as clearing solutions of hypo., &c., they are all that is required, and are practically more useful than paper.

Asbestos, sand (which should be well washed before using), powdered glass, &c., are useful for corrosive solutions, which would destroy paper or woven fabrics. Nitrate of silver is often recommended to be filtered by this plan, but it possesses no advantage over paper, and is bulky and troublesome, and a funnel has to be set apart entirely for one chemical, as the putting together of the filter occupies some little time. In using sand, &c., a layer of large pieces of glass or of pebbles is put at the bottom of the funnel, and on this a layer of smaller pieces, followed by one still finer, and lastly a thick layer of sand of the desired fineness.

When filtering very volatile liquids a funnel with a ground rim should be used. This is covered with a plate of glass, with a small hole perforated in it, to which is attached a piece of narrow india-rubber tubing, the other end of which is connected with a small hole in the cork of the bottle, through another hole in which the funnel neck passes tightly. By this arrangement no loss by evaporation can take place, the india-rubber tube serving to equalise the air in the bottle and the funnel by conveying it to the funnel to supply the place of the fluid which descends. This method may be applied to the filtration of collodion if required; but the clearing and brightening of this rather viscous solution is far better brought about by subsidence and decantation.

G. Watmough Webster, F.C.S.

THE THEORY OF THE LATENT IMAGE.

At page 437 in your issue of the 11th ult. Mr. Sutton contributes another article on this subject, in which he criticises the remarks I published a week previously. He appears, however, to have mistaken the intention of those remarks, inasmuch as he assumes that I hold the sub-bromide theory to agree with all the facts observed in the production of a developed image. It was certainly not my intention, in penning the article, to convey such an impression, as I quite agree with Mr. Sutton in believing that that theory fails to satisfy us on many points—in fact, breaks down. What I actually suggested was that Mr. Sutton's oxybromide theory, though apparently agreeing with and accounting for most of the known facts in connection with the subject, failed from its very improbability to commend itself as any advance upon previous research. I must at the same time acknowledge that Mr. Sutton has handled the subject with the ability that might have been expected from the time and attention he has devoted to it, and I should be most happy could I agree with him throughout.

Mr. Sutton bases his theory upon the formation of a hypothetical substance with the formula—

$$Ag\,Br\,Ag_2\,O,$$

that is one equivalent of bromide of silver in combination with one equivalent of oxide of silver. If we condense this formula slightly we have—

$$Ag_3\,Br\,O,$$

or one equivalent of sub-bromide of silver in combination with one equivalent of oxygen. To form such a compound in the sensitive film the bromide of silver must give up a portion of its bromine, and absorb, in its place, an equivalent of oxygen—must, in fact, *part with a substance for which it has a very strong affinity, and absorb, instead, a substance with which it is only made to combine with difficulty*, and this by the mere fact of a few seconds' exposure to light. In contradiction to this I have read somewhere that oxide of silver is reduced to the metallic state by the continued action of light.

Mr. Sutton takes me to task for suggesting that, under certain circumstances, development would take place instantaneously. In employing the expression "instantaneous" in connection with the exposure of plates it is usually understood to imply an extremely brief period of time—a fraction of a second. In its literal sense instantaneity is as difficult of comprehension as the antithetical term "eternity," and in speaking of an exposure which shall commence and terminate at the same moment of time is an obvious impossibility. In connection with the *commencement* of any action—development, for instance—it is, however, quite intelligible, such action commencing at a certain moment and not extending over any period of time, ceasing to be instantaneous as it ceases *to commence*. Mr. Sutton will scarcely demur to the *possibility* of development *commencing* the instant the developing solution comes in contact with the film. As regards the reduction of its entire thickness, I must refer Mr. Sutton to my article, where he will find that I say "development would be *almost* instantaneous."

In reply to the question as to why ninety atoms unacted on by light are reduced because ten atoms that *were* acted on have been reduced, I would say that I hold to the theory that development is to a great extent merely a continuation of the action of light, with the difference that development is capable of carrying the effect much further. My idea is that, according to the actinic effect produced by light, so in proportion will the action of the developer extend *beyond* the light's action. Mr. Sutton appears to assume that I only recognise this extended action in a downward direction or through the thickness of the film; on the contrary, I believe it to take place in every direction, and to constitute one of the species of "blurring" or "halation."

I need offer no further explanation on the two principal points upon which Mr. Sutton lays stress in his strictures upon my article; but I would take exception to the supposition that the action of light, "by reducing the silver bromide to the state of oxybromide, sets free hydrobromic acid," &c. Mr. Sutton has shown how this effect *may be* produced in the case of silver bromide in the presence of moisture; but I fail to see any *probable* source of hydrogen in a dry-plate film. Even supposing the oxybromide theory to be correct, I cannot imagine that the disengaged bromine is converted into hydrobromic acid; but, undoubtedly, it gradually re-enters into combination with the substance forming the latent image, whether it consist of oxybromide, sub-bromide, or anything else.

Since writing the above I have read Mr. Sutton's letter, at page 477, and beg to assure him that I not only read his articles most carefully, but had them before me when I wrote upon this subject previously. To prove to him that I *have* treated him conscientiously in the matter of thoroughly reading them with the object of getting at his meaning, I would ask him to turn to page 388. He there gives the following explanation of the formation of oxybromide of silver:—

$$\text{"}3\,Ag\,Br + H_2\,O = Ag\,Br,\,Ag_2\,O + 2\,H\,Br.$$

Three atoms of bromide of silver, *plus* one atom of water, equal one atom of oxybromide of silver, *plus* two atoms of hydrobromic acid."

Will Mr. Sutton kindly further explain this in connection with the paragraph devoted to my special benefit in his last week's letter? In that letter he distinctly says that the oxybromide is only formed in the presence of *organic matter*, and not in the presence of water. In the explanation quoted above he says *not a word of organic matter, but introduces an atom of water to supply the necessary oxygen*. Surely when Mr. Sutton himself allows for a certain amount of moisture in a *dry-plate film* in order to account for the formation of a hypothetical substance, he will concede that I was not without warrant in supposing, as I innocently did, that it might be produced by the action of light on pure bromide of silver in the presence of water. If Mr. Sutton should adhere to the formula quoted, and argue that the oxybromide is formed in the film by catalytic action on the part of the organic matter, it seems to me only one more objection to his theory.

The subject of the latent image has been a favourite hobby of mine for some years, and I am always glad to meet with any new ideas in connection with it. Though unable to agree with Mr. Sutton on all points, I must express the pleasure I have experienced in this discussion, and hope that it may not prove barren of results. In such a discussion the mere fact of bringing the ideas into action may induce a new line of thought leading on to the elucidation of the subject under consideration. I sincerely hope it may be so in this case.

W. B. Bolton.

FOREIGN NOTES AND NEWS.

M. Cornu's Method of Correcting Astronomical Object-Glasses for Photography.—Signor Borlinetto's Process of Printing in Fatty Ink.—New Photographic Journal.—Moonlight Photographs.—Albumenised Paper.

Two very interesting and important communications have been made by M. A. Cornu to the French Committee of the Transit of Venus (in December next), respecting a method by which common achromatic astronomical object-glasses may be corrected for the chemical rays, and also a method by which the daguerreotype process may be employed in taking photographs of the transit.

In the object-glass of a common astronomical telescope the correction for colour relates to vision only, and has no reference to the violet or chemical rays which act upon the salts of silver in a sensitive photographic plate. In other words, the yellow and blue rays are combined instead of the yellow and violet; and the consequence is that, owing to the irrationality of dispersion, the focus of the violet rays is thrown farther from the lens than the combined focus of the yellow and blue rays. A photograph taken upon a plate which is placed in the visual focus of such a lens will, therefore, be indistinct, and it becomes necessary to remedy this defect before the lens can be used for photographic purposes. MM. Fizeau and Foucault recommended, some thirty years ago, in the case of object-glasses having a diameter of less than one-twelfth or one-fifteenth of their focal length, to find the chemical focus of the lens by experiment. This method, M. Cornu tells us, has been found by himself to answer in the case of the large equatorial in the observatory at Cadiz, lately constructed by MM. Brünner. The object-glass of this instrument is about seventeen feet focal length and one foot diameter; and Mr. Rutherfurd has congratulated MM. Brünner on the success of their photographs of the moon taken with it. Nevertheless, when photographs taken in the above way are considerably enlarged, defects become apparent which are not found in the enlarged optical images, owing to the want of focal coincidence of the differently refrangible violet and ultra-violet rays. Mr. Rutherfurd has attempted to surmount this difficulty in two ways—first, by altering the curves of the object-glass; secondly, by adding a third lens to it. The serious objections to both methods are sufficiently obvious. The method suggested, and proved to answer, by M. Cornu, consists simply in separating the flint and crown lenses of the object-glass by a small fractional part of its focal length, viz., about one-half per cent. In other words, find by trial the chemical focus of the object-glass, which will be about one-fiftieth of its optical focus behind that, and then separate the lenses by that distance apart. This operation will shorten the focus of the object-glass by about one-twentieth, after which its aperture must be reduced by means of a diaphragm, so as to retain the same angular aperture. An object-glass of four inches diameter and forty-four inches focal length thus treated gave an excellent result.

A practical objection to the plan seems to be that telescopic object-glasses are frequently made with component flint and crown lenses, which are cemented together with Canada balsam, in order to diminish internal reflexions—a method which was first introduced by the late Mr. Andrew Ross. Compounds thus cemented could not, of course, be used in the manner proposed. The lateral aberrations produced by the separation of the glasses do not seem to be greater than in the case of the third lens introduced by Mr. Rutherfurd. Our author states that an object-glass of four inches diameter treated in the manner described, and yielding an image of the sun about half-an-inch in diameter, is sufficiently large for the observation of the transit, because when the image is taken upon a daguerreotype plate it will bear perfectly all the necessary enlargement or scrutiny under magnification. The telescope must be provided with a finder, and the shutter of the dark slide must be contrived so as to expose the plate instantaneously as soon as the image of the sun is brought upon the cross wires. The daguerreotype process is preferred to that with collodion. The plate may be simply iodised—no bromine being necessary, since its sensitiveness is quite sufficient without. It should be developed in a mercury box at a temperature of 113° F. It must be fixed with hyposulphite of soda, but need not be toned with *sel d'or*.

The optical appliances are thus reduced to the extreme of simplicity, whilst the photographic process is also the most simple known, and that which yields the finest results in point of sharpness of definition. Several images of the sun, taken in the above manner by M. Cornu, upon daguerreotype plates were submitted by him to the Committee, for their careful examination and criticism. Should, however, larger images of the sun be desired, M. Cornu is of opinion that object-glasses of five inches diameter and eighty-eight inches focal length—giving a solar image nearly an inch in diameter—would answer the purpose satisfactorily.

Every true lover of science must rejoice to know that the French expedition to observe the transit has gone out provided with daguerreotype plates, so as not to trust to the collodion process only. These plates may be excited hours in advance, and may be developed hours after the exposure, so that in this respect they have all the practical convenience of dry plates. There is no shrinking of the film, as in the collodion process; and the image—instead of being contained in a thick mass of glutinous matter, subject to a variety of special imperfections, and developed by a liquid which mixes more or less imperfectly with that upon the film—lies upon the polished surface of a silver plate, rendered sensitive by the impalpable fumes of iodine, and is developed by the impalpable fumes of mercury, given off at a temperature but little higher than that of the surrounding air. For a purely *scientific* purpose there can hardly be a question as to the superiority of the process of Daguerre over all the other known methods, and it is surprising that scientific men in general ignore it so much as they commonly seem to do.

Signor L. Borlinetto has lately published, in the *Rivista Fotografica*, the following method of obtaining photographic prints in fatty ink:—Coat a well-cleaned glass plate with ox-gall, which may be preserved for a long time by the addition of creosote. With a bit of flannel rub lightly the surface of the glass, so as to spread the substance equally upon it. Dry the glass plate at a gentle heat, and, whilst it is still warm, put it upon a level support, and pour over it the following solution:—

Gelatine	5 grammes.
Water	50 „
Rock alum	1 gramme.

This should be well filtered through a flannel, and used whilst still warm. Should any difficulty occur in spreading the solution a strip of cardboard may be used for the purpose.

Next, take a sheet of rather thick white paper; soak it thoroughly in a dish of water, and wipe off the surface moisture with blotting-paper. Then apply this to the gelatinised surface of the plate, taking care to avoid air-bubbles, and also that the gelatine does not get upon the back of the paper. Let the whole remain until the next day, when, if the weather be not too moist, the sheet of paper coated with the gelatine will detach itself spontaneously from the glass; or, if not, it may be detached easily by passing a penknife round the edges. The surface of the sheet is brilliant, and it may be preserved indefinitely.

When the sheet, thus gelatinised, is to be employed for printing purposes it must be immersed in a solution of bichromate of potash at three per cent. (about fourteen grains to the ounce), then hung up to dry, and exposed under a negative. As soon as the image appears in all its details the sheet of paper must be immersed in the following solution:—

Silver nitrate	1 gramme.
Alcohol	20 grammes.
Water	50 „

The surface then becomes of a brick-red colour, owing to the formation of chromate of silver. After washing it with pure water a solution of ammonia, diluted with three times its bulk of water, must be poured over the surface. The red tint will now disappear, because chromate of silver is soluble in ammonia, and there will remain a pale green image composed of oxide of chromium. After another washing the sheet of paper must be placed, image upwards, upon a clean board of hard wood, and be pinned down securely with drawing pins. The surface moisture is then to be removed by a clean and dry sponge, after which the image must be rolled with a lithographic roller charged with fatty ink.

The advantage of the above method is said to be that the greasy ink attaches itself at once to the proof, even when it has been over-exposed, and one never gets reversed images, as happens in the other methods when the undecomposed salt of chromium is not eliminated. The gelatine, by the addition of alum in the first solution and its immersion in the bichromate bath, becomes completely insoluble, and its toughness is still further increased by the silver solution.

We have received from the Secretary of the *Association Belge de Photographie* the first two numbers of the *Bulletin* of that Society. Each number contains an illustration printed in printing-ink by the collotypic process, or, as it is called at the foot of the proofs, "*heliotypie*." This new journal is published monthly, the annual subscription being twelve francs without the illustrations, and twenty-five francs with them. Office, No. 41, Rue du Namur, Brussels. Respecting the contents of the two numbers just received we shall have more to say in our next.

A deal has been said lately—*not* in photographic circles exactly, but outside them—about moonlight photographs, and we were somewhat surprised the other evening to find that persons of culture exist who believe that landscapes can be actually photographed by the light of the moon. A little thought, one would imagine, might suffice to satisfy these persons that such a belief was mere "moonshine." However, for the enlightenment of our readers we may mention that, years ago, Herr Krone reckoned that the light of a winter's day or of a magnesium light was as 6,000 to 1, so far as actinism was concerned, compared with that of the moon. In such a case, although a photograph of the moon may be easily enough obtained, photographs by it might as well be hoped for as by the light of a tallow candle.

Herr Gustav Re, writing to the *Photographische Archiv* from Jeletz, in Russia, says that he has found it a very good plan to add a little chloral hydrate (about two drachms to the white of a hundred eggs) to his albumen. It causes the albumen to keep better than ordinary salts, and the paper albumenised with albumen so mixed keeps much better after silvering than the usual kinds. On neutral or acid silver baths the chloral hydrate is innocuous—has, at least, no perceptible effect. He urges that those who manufacture albumenised paper would do well to adopt this method in carrying on their work. It would free them from the health-endangering smells which prevail about albumenising establishments, as well as secure to the photographer a paper that would keep better than those he can obtain now. And he may be right; but we must remember that what he expressively calls "*stinkender*" albumen sheet is a sort of manufacture almost peculiar to the continent. English makers usually work with less rotten albumen, and probably attain the same end which Herr Re desires to reach by a simpler way.

THE SIXTH AMERICAN NATIONAL PHOTOGRAPHIC CONVENTION.

CHICAGO MEETING.

Of the Wednesday meeting we are furnished with very meagre details. It appears that much time was occupied in removing the pictures from the building in which the exhibition took place, and which was thought to be jeopardised by the fire raging in the city, and, after the danger was over, in subsequently re-hanging them.

In the evening the Exposition Building was well filled with visitors, a considerable number of whom were ladies, all seeming to enjoy the exhibition very much. The California landscape views by Bradley and Rulofson, of San Francisco, the imperial *souvenir* and life-size portraits by C. D. Mosher, the direct life-size likeness by Barhydt, of Rochester, and the pictures from the gallery of Bogardus, of New York, attracted much attention.

At eight o'clock the polls were opened, and the Association proceeded to the election of officers for the ensuing year.

On the following day the result of the election was reported, and the President elect, Mr. W. H. Rulofson, of San Francisco, was then conducted to the chair, on assuming which he made a pleasing address, returning thanks for the honour conferred, and pledging his best labours for the promotion of the interests of the Association.

The following resolution was introduced by Mr. Loomis, of Boston:—

Resolved, that the heartfelt thanks of the National Photographic Association are hereby presented to our retiring President, Mr. A. Bogardus, of New York, for the very able, efficient, and impartial manner in which he has discharged the important and oftentimes difficult duties of the position for the past six years, and that, while we regret his determination to decline a further testimonial of the honour, we sympathise with his wish to be relieved from its continued labours and responsibilities.

The resolution was seconded by Mr. G. M. Carlisle, of Providence, R.I., and was unanimously adopted.

The body then devoted half-an-hour to the consideration of the best plan of discharging its debt, which, it was stated, amounted to nearly $3,500. There was a lively and practical session, about $1,000 being assured in gifts of money and presents of artistic value.

The ex-President (Mr. Bogardus) was then called to the platform to respond to the vote of thanks for his services which had been adopted by the Association. He replied in a short and appropriate speech, and asked permission to give the Society a motto for its guidance during the coming year. Last year he had given as the motto—"Try to Excel—not Undersell." This year the motto most needed was—"Uphold your Officers."

Medals.—Mr. John R. Clemons, from the Committee on Medals, submitted the following report, which was approved, and ordered to be placed on the file.

We, your Committee appointed at the last annual meeting to award the Holmes-Scovill medals for the greatest improvement in photography during the year past, beg to make the following report:—After a careful examination of the articles presented for competition, at a first and adjourned meeting, award the gold medal to W. G. Entrekin for his photographic burnisher, and the silver medal to S. V. Moulton for his rapid photo-washer.

The Committee also submitted a supplemental report recommending the desirability of restricting the competition for all medals to non-patented articles, and to award them only to such mechanical devices and formulæ as may be offered free by the discoverer for the use of the fraternity.

The recommendation was adopted, and the Committee instructed to act accordingly.

The remainder of the morning session was spent in listening to speeches from other newly-elected officers, and in the collection of subscriptions to liquidate the debt of the Association.

At the afternoon session little of public interest is reported to have been done, there being much discussion on the subject of local patents; after which

Mr. Bogardus was called to the stand and made the recipient of a handsome present—a silver pitcher and two goblets. The presentation address was made by Mr. Fitzgibbon, and briefly and happily responded to by the recipient.

In the evening there was a large gathering at the Exposition Hall of the art lovers of the city, and many of the works of the photographers were sold by auction, the proceeds to be applied to the discharge of the indebtedness of the Association. Mr. Rulofson, of San Francisco, officiated as auctioneer, and conducted the sale with great spirit and eminent success.

On Friday, at the morning session, the proceedings of this the last day began with the reading of the report upon insurance, which had been made the special order of the day. The first report was a draft of a constitution for a Photographic Mutual Life Insurance League. Knowing that their chosen profession was detrimental to life and health, and that many of their number were not successful enough to leave their families above want, they proposed this method to assist each other, and aid those who were unable to obtain other life insurance because of ill health. The obligation under which each of the members would be is as follows:—

We, the subscribers, mutually agree that in every case of the demise of any of the subscribers the survivors should each pay one dollar to the legal representatives of the demised.

The second report was upon a constitution for a fire insurance company, to be called the "National Photographers' Fire Insurance Company." In this only the property of photographers would be insured.

Upon the motion to adopt these reports,

Mr. Loomis said the object of the Association was to criticise the work and help the members. If they should proceed to form insurance companies, as had been proposed, they would find themselves drifting away from the true object of their union. They were even now weak. They should wait till they were off their knees before they bound themselves to carry on such an undertaking. He favoured life insurance companies, but did not wish to see their Association a prosecutor or defendant in the courts.

Mr. Webster thought the motion premature, and moved that the papers be referred to a committee to report upon at the next annua convention, which motion was carried.

The Committee on the Constitution reported, through its chairman, that the work was so important, the Society having outgrown the old one, that more time was needed, and asked until the first session of the next annual meeting. This request the members granted.

Communications were then received from persons wishing situations, and a purse of $15 was raised for one of the lady members who had been robbed, and had not sufficient money left to get home with.

Much amusement was then excited by a large model of a bath-dipper, presented by Mr. Knight, made large, according to the President, for "gentlemen of hard-hearing who could not see well." The advantages of this dipper were that it did not disturb the collodion in the bath, and, being made of a single piece of seasoned hickory, was cheap, durable, and easily obtained and handled.

Mr. Wilson made a statement of the financial condition of the Society, which showed it to be in a much more prosperous condition than upon entering the city. The Association met in Chicago with a debt of nearly $3,500. It has received from dues, $833; subscriptions, $690; Benecke pictures, $183; the auction, the day but one before, $459.01; other sources, $500. There had been presented to the Society two beautiful cameras. One was presented by Messrs. E. and H. T. Anthony and Co., of New York. The case was a fine chestnut and mahogany one, with nickel plating. This was sold at auction for $135. The second—a mammoth camera and lens, presented by the American Optical Company of New York, and Benjamin French and Co., of Boston—was raffled off at $3 a ticket, 211 tickets being sold. The proceeds of both of these cameras were devoted to the liquidation of the debt, and by this and the funds above-mentioned the debt of the Association was entirely wiped out.

Mr. Bell then spoke very warmly of the pleasing time they had had in the city, and expressed very hearty thanks to Chicagoans for their kind treatment to all the members, and he assured the Association of an affectiouate welcome in Boston next year.

The Secretary of the Organisation was authorised to fill any vacancy that may occur in the official ranks during the ensuing year.

The Committee on Frames awarded the gold medal for frames to W. Gillis, of Rochester, New York.

Mr. Rulofson, in his farewell remarks, expressed joy that the debt was paid, and hoped that next year the Convention would not have to consider money matters as they had at this session, but might devote their whole time to the legitimate work of the union—to practical photography. He said he had not expected to attend the meeting this year, and, if he had known what duties were to be required of him, he would have come better prepared to perform them.

Votes of thanks were tendered to both the Secretary and the President for their efforts on behalf of the Association.

The afternoon session was very thinly attended, and the time was all taken up with the discussion of the trials of the art and how to get over them.

The first difficulty for which a remedy was asked was—How to make a bath work regular; or, as Mr. Collin put it—"Why does a bath of collodion work differently on the same day, and under apparently the same conditions, except time of day?"

Many answers were ready, some thinking it was owing to the varying temperature. In the cool air of the morning it would settle thin and flat, but in midday heat the negative would be thick and filmy. Some blamed the light and some the chemicals. The remarks of Mr. Hall seemed to meet the approbation of all when he said that observation alone could tell whether it was in the chemicals, in the light, or in the operator himself; but, as a general thing, its variation depended more upon the variation in the manipulation of the chemicals than in the chemicals themselves.

The next difficulty was in the process of silvering. One gentleman said that his bath used to act as if he silvered too short a time, or with a solution too weak.

Mr. C. A. Wilson had had the same trouble, and found that it was because the paper had been kept too dry, and that if it was kept in a damp place from twenty-four to forty-eight hours before using this fault would be avoided.

Mr. Hern, of Philadelphia, said—To use the Hovey paper which had been kept damp forty-eight hours before using, put one corner of the paper in the bath first, and draw it diagonally through after it had floated some twenty seconds; then draw it over a plain glass rod to remove the tear-drops. He kept his bath always a little alkaline by liquor ammonia. Generally he did not favour drying the paper by gas, as it was apt to be spoiled by iron fumes, which he supposed to rise from the stove over which the operation was usually performed, and the iron particles, uniting with the water in the paper, caused the damage. Whenever the process was used the drying must be done quickly.

Mr. St. Clair spoke of the danger of adding glycerine to nitrate of silver to form a bath, as formerly suggested by Mr. Clemons. He said that immediately upon the addition of the glycerine nitro-glycerine was formed, which was one of the most dangerous of explosives. A warm discussion was created on this point. Some held that no such compound was ever formed in such a bath, and that the addition of nitrate of silver to ammonia in the process of fuming was much more dangerous; that in the former case the compound was not a dangerous explosive. Others held the opposite view, and those were present who testified of the losses they had received from the use of this process.

Mr. A. S. Southworth then made some concluding remarks upon the necessity of close observation, summing up his remarks in his advice to the members of the art present to "use their eyes for form, their hearts for feeling, and their whole person, soul and body, for the highest motives and for the purest feelings, and not to think about the pay."

The sixth annual convention of the National Photographic Association was then adjourned. The next meeting will be held in Boston the second Tuesday in July, 1875.

Our Editorial Table.

A Peep at Mexico. By John Lewis Geiger, F.R.G.S.
London: Trübner and Co.

Amongst the many works of travel in which photography has been called to play the part of illustrator in none have we seen its services laid under contribution to such an extent as in Mr. Geiger's *Peep at Mexico.*

During the months of December and January last, while journeying across the Mexican Republic, from the Pacific to the Gulf, Mr. Geiger had with him as travelling companion a portable set of photographic apparatus, which the volume now before us proves to have been used with excellent effect. The portion of Mexico more particularly described by our author is that to the westward of the metropolis, of which less is known than other parts; and the various scenes visited, together with the manners and customs of those among whom the author sojourned, have been depicted with such discriminate minuteness of detail that, aided by the photographic illustrations, one becomes quite interested, and, as a consequence, acquires a very great fund of information.

Colima, where Mr. Geiger remained over five days, is a town of twenty-five thousand inhabitants, and is laid out in long, straight streets about thirty feet wide, paved with large round pebbles or cobble stones. Many of the houses have beautiful interiors, but outside they present a dull and monotonous appearance—a fact of which an inspection of the photographic illustration leaves no room for doubt. There is also an illustration of an old cathedral, which stands on the eastern side of the public square or *plaza*, and which certainly can make no pretensions to architectural elegance or beauty. Of views taken in Colima or its suburbs there are no fewer than eight, so that one acquires a very fair idea of the town, while that knowledge is enhanced to an inconceivable degree by the able description of the customs of the inhabitants, who, we are informed, are mainly of Indian descent.

This happy combination of photography and lucid description applies to all the places visited. We are told that there is such a sameness about small Mexican towns that the stranger at first sight can hardly discern any difference between them. Sayula, for example, is so much like Zapotlan that the two towns were almost thought to be the same—there being the same streets, the same badly-paved roadways, the same low, whitewashed houses, and the same inn furnishings and accommodation. Among the several views taken at Sayula one is specially interesting, comprising, as it does, a group of fourteen, part of the escort in the patio of the Fonda, at Sayula. They have, certainly, the appearance of being a thoroughly wide-awake lot.

Upon nearing Guadalajara, rifles and revolvers were brought into requisition; for travelling in Mexico is not quite so safe as in Great Britain, and it is in the vicinity of large towns that attacks occur most frequently, Guadalajara, of all places in the Republic, bearing the worst character in this respect. However, our traveller and his friends reached the town in safety. This is the second town in the Republic, its population being about seventy-five thousand. It is five thousand two hundred feet above the level of the sea, and "this altitude," says Mr. Geiger, "in the tropics has the advantage of a climate very little short of perfection. Guadalajara forms no exception to the rule; its inhabitants are in the enjoyment of perpetual summer, a light, clear atmosphere, and a sky as bright and blue as sapphire itself." This town furnished quite a variety of photographs, some of them being very fine.

In this way, between word painting and photographic representation, we have the leading towns of Mexico brought within our intimate acquaintance. Unlike the usual class of Mexican towns, we find that Guanajuato, so famous for its silver mines, is essentially Spanish in its features. The view of the north-west part shows a number of streets and terraces rising one above the other on the side of a steep hill.

Of the merits of the photographs little need be said; they were not taken so much with an eye to pictorial effect, or to make merely pretty pictures, as to convey an accurate idea of the several plans delineated. Many of them, however, possess much merit even as pictures.

The immense value of a portable set of photographic apparatus as part of the *impedimenta* of the tourist or traveller cannot be over-estimated. While the work before us possesses sufficient intrinsic, literary, and descriptive merit to render it of value, that value is greatly enhanced by its illustrations. Photography is now reduced to such a state of manipulative simplicity that no one ought to travel in distant or partially-known countries without such an accompaniment. With a portable camera and a few dozen dry plates valuable mementoes of such a tour may be secured, which may be utilised either for distribution among friends, for purposes of pictorial publications, or, as in the present instance, for enhancing the value of a book of travels.

In addition to the photographs—which have been beautifully printed in mechanical autotype by Messrs. Spencer, Sawyer, Bird and Co.—the work contains several maps, one of which is a hypsometrical sketch map of Mexico, in which by four grades of colour the height of the land above the sea is indicated.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held on Tuesday, the 29th ult., at the Free Public Library, William Brown-street,—the Rev. J. D. Riley, Vice-President, in the chair.

The minutes of the previous meeting were read and passed.

Mr. J. A. Forrest exhibited several 16 × 12 negatives of the lake district, and two were chosen from which the presentation plate should be taken.

Mr. A. Tyrer exhibited several fine prints taken at Miller's Dale, which were much admired, and a wish was expressed that if the other negatives selected were not suitable the presentation prints should be taken from Mr. Tyrer's.

The Chairman showed a number of prints of Pantasaph Church and Monastery, taken by the wet collodion process.

A portfolio of views taken at the African diamond diggings, called *Gems from the Diamond Land*, by Messrs. Gray Brothers, were examined with much interest. They were kindly lent for exhibition by Mr. G. F. Chantrell.

Negatives were handed round taken by the new emulsion prepared by the Liverpool Dry Plate Company, and exposed by Mr. Weber, the Secretary, and others, all of which showed the excellence of the emulsion.

Mr. Phipps handed round some negatives taken at Dolgelly with the same emulsion, and some taken with emulsion prepared by himself. They were all so good that Mr. Phipps was requested to state his method of preparing them. Mr. Phipps explained that his first experiments in the preparation of the emulsion were made with collodion bromised with cadmium only, and though he tried various organic additions to induce density he was unable to obtain it. Subsequently he tried a collodion containing bromides of cadmium and ammonium, and there was a marked improvement in the result. Finally he used a collodion bromised with ammonium only, and this gave a still better result. The image was capable of being brought out by plain pyrogallic acid, by which the exposure could be judged of with great accuracy; there was no difficulty about the intensity. After the formation of the collodio-bromide it was filtered into a dish and allowed to thoroughly set, then washed with distilled, and subsequently with ordinary, water. The thick film, being broken up into small pieces to facilitate the removal of the soluble salts, was, after a thorough washing, squeezed as dry as practicable and treated with three or four doses of alcohol (filtered) for the purpose of absorbing the water contained in the broken film; finally, sufficient of a mixture of ether and alcohol was added, and the operation was complete. No organic addition whatever was made to the collodion. He had kept emulsions prepared in this manner for about two months, and had no doubt it would be found to possess indefinite keeping qualities. The plates were prepared by flowing over the collodion in the usual way and allowing to dry. In developing he followed the printed instructions issued by the Liverpool Dry Plate Company. Great latitude was allowable in the exposure. If the preliminary treatment with plain pyro. showed that the plate was over-exposed it could be continued until all the detail was out, and intensified by the addition of acid silver. He exhibited a negative developed in this manner. If the light was bad the strong alkaline developer was preferable. Mr. Phipps promised to experiment further, and give definite formulæ at the next meeting.

Mr. Lewis Hughes then described, with the aid of diagrams, several improvements he had been making in the working of the heliostat attached to his camera for enlarging microscopical objects. Some exceedingly fine microscopic enlargements were exhibited by Mr. Hughes.

The meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on Wednesday, the 19th August, when M. Leon Vidal, the Secretary, read a letter announcing the formation of the Association Belge de Photographie at Brussels.

Among several new publications which were laid upon the table was included the second edition of the *Traité Complet de Photographie Pratique*, by M. A. Liebert. This is an important new work, beautifully illustrated by specimens of helio-engraving and the Woodbury process from the *ateliers* of MM. Goupil. It is interesting to compare the proofs of a portrait from the same negative by these two processes. The comparison is by no means unfavourable to the proof from the photo-engraved plate. The work treats of all the important novelties in the art, and gives a large place to those processes by which permanent prints are obtained. The other works presented to the Society comprised *Manuel Elémentaire de Photographie au Collodion Humide à l'Usage des Commençants*, by M. Eugène Dumoulin; *Premieres Leçons de Photographie*, by M. L. Perrot de Chaumeuse—2nd edition, revised and enlarged; *Traité Pratique Complet d'Impression Photographique aux Encres Grasses*, by M. L. Moock. Also, a *Compte Rendu* of the recent Exhibition of the French Photographic Society, by M. Junca; and *Programmes* of the Photographic Exhibitions of Amsterdam and Calcutta.

The Secretary then offered some remarks on the present state of photography, casting a rapid *coup d'œil* over the work recently done, so as to measure the progress gained and create a point of departure for fresh advances. Turning first to improvements in the negative processes, he alluded to the interesting and remarkable results described by Messrs. Sutton, Vogel, M. Carey Lea, and Monckhoven. Mr. Sutton, in striving to obtain more sensitive films, had been inspired by a happy idea. His bromised collodion, by the aid of which moist plates might be prepared which were not only as sensitive as the best wet ones, but would retain their sensitiveness during a whole day unimpaired, was capable of rendering great service to the art. He placed great reliance both on Mr. Sutton's practical as well as theoretical knowledge. He had also heard with satisfaction of the experiments lately made by the other above-named authors, relating to the influence of different colours upon collodions specially prepared, with the view of obtaining thereby a more faithful translation into monochrome of the colours of nature, so as to produce more softness and harmony in the photograph, and avoid those heavy blacks which were yielded by objects of a yellow, red, or green colour. With respect to positive printing, the permanent processes in printing ink of MM. Rousselon, Baldus, Amand Durand, Dujardin, &c., were advancing rapidly in public favour, as proved by the many fine specimens recently exhibited in the Palais de l'Industrie. The future of our art he conceived to lie entirely in these photo-mechanical processes of printing. It was grievous to see so many proofs, essentially perishable, still produced by the old silver chloride process, whilst so many better methods were now open to the choice of the photographer—helio-engraving, carbon printing, photolithography, and photoglypty. Silver printing might answer the immediate purpose of a professional portraitist, but it should be remembered that nothing permanent, and therefore nothing of serious value, could be produced in that way; and the process ought to yield the place to methods by which permanency could be secured. After a few observations on the photo-chromic processes, and experiments of MM. Becquerel, Saint Florent, and Ducos du Hauron, he (M. Vidal) concluded by offering some remarks on his own method, concerning which he discoursed with his usual eloquence and enthusiasm, predicting for it a great and important future. He pointed out its special value as a means of copying, with perfect half-tone, objects in gold, silver, bronze, &c.

A Member present asked whether it was true that positive prints fixed with sulphocyanide instead of with hyposulphite of soda were as permanent as carbon prints.

M. Vidal was surprised at the question, for there could be no doubt they were not. One might as well suppose that the moon gave out as much light as the sun. The following simple test would be sufficient:—Plunge the point of a needle into any liquid slightly acid with nitric, sulphuric, or hydrochloric acid, and then prick the proof with it. If fixed with sulphocyanide a white spot would be quickly produced round the puncture; whilst the carbon print, similarly treated, would remain unchanged. Images with a metallic base were liable to fade from the endless modifications of the conditions in which they were placed. The moisture of the air—its state more or less carbonous, sulphurous, alkaline, or acid—and even the sizing of the paper support acted upon such proofs, oxidised, and finally destroyed them. Nothing was really stable but proofs in carbon.

The meeting was shortly afterwards adjourned.

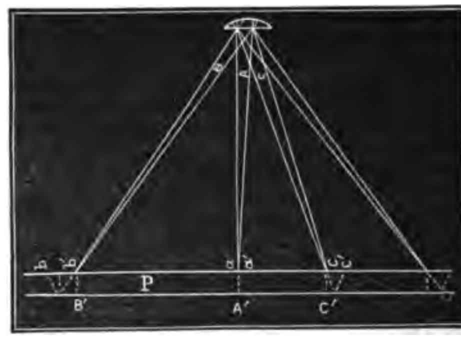
Correspondence.

HALATION.

To the Editors.

Gentlemen,—I will, as you wish, again try some negatives with silvered and non-actinic backing, though I have done so repeatedly, and I will send you the results.

But before I do so pray understand what my hypothesis is. You speak of the plates being very dense. They are ordinarily so. But suppose they were *very transparent*, what ought to be the result? The accompanying diagram will explain my position. Suppose the converging



rays A B C to be entering the camera through the lens and proceeding to form images on the sensitive surface of plate P, of exaggerated thickness. Suppose that sensitive surface to be semi-opaque, and that a part of each ray is arrested to form its respective image at *a b c*, whilst the remainder travels on to the reflecting back. Then, I say, the effect ought to be that a *second image* a little out of focus ought to be formed at *b'* and *c'*, which would be much more perceptible at the extremities of the plate than at the centre.

Now this is a result which I have never seen, nor have I ever heard it complained of; but certainly it would never present the appearance commonly called "halation" or "blur."

I see by Colonel Wortley's letter that different people understand different effects under these names, and, therefore, I repeat that by "blurring" I understand fogging chiefly about the centre of the plate where the light is strongest, and by "halation" the partial solarisation through a bright opening which extends on either side of it. To whatever other causes these may be owing my conviction is that the reflection from the back of the plate has nothing to do with them.—I am, yours, &c.,

Hilgay Rectory, October 5, 1874. St. Vincent Beechey.

"MR. DUNMORE'S ACID DEVELOPER."

To the Editors.

Gentlemen,—The want of evidence I alluded to in my letter in your issue of the 25th September referred to that "purely mechanical" action which constitutes, in the opinion of Mr. Dunmore, the function of the "saccharine and colloidal substances" he mixes with his developer. The fact of "photographers of high repute" being "delighted" with the "identical formula" employed by him may be, as he says, "evidence valuable"—of something; but it is not "evidence valuable" of that mechanical action whose operation he believes to consist in "cementing together, as it were, the film and the silver particles thereon deposited." This or some other form of mechanical action may, indeed, take place; but, so far as I have seen, it still remains unproven, and, therefore, evidence is wanted to establish the *opinion* as a fact. That evidence will probably appear in the form of comparative experiment; certainly, however, not in the form of mere "delight," by whomsoever indulged in. "One word more," as clergymen say, "and I have done." If, as I gather from the penultimate paragraph of his last, there be "no novelty" in the developer your correspondent uses, would it not be quite as well to disconnect from his allusions to that "mixture" the too frequent use and repetition of the first personal pronoun in the possessive case?--I am, yours, &c., D. WINSTANLEY.

October 3, 1874.

TECHNICAL EXHIBITION MEETING OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I shall feel obliged if you will kindly permit me to call attention to the forthcoming Technical Exhibition Meeting of the South London Photographic Society. It will consist, not of an exhibition of pictures, but of various improved appliances and methods of producing pictures. We invite the exhibition of all kinds of apparatus that may have any novelty or improvement beyond those in general use.

We also invite short, pithy papers of a strictly practical character. Anyone who has something fresh which he has worked out is invited to contribute, whether it be derived from the glass-room, the dark-room, or the field, especially if illustrated by a specimen.

Patented articles and the results of secret processes, if distinctly stated to be so, will be eligible.

Opportunity will be afforded, as far as possible, for working a process or making an experiment in the presence of the meeting. Questions may be asked in relation to the articles exhibited, and information may be given; but the time will not permit of discussion.

Full particulars of the time and place of meeting will be furnished next week; in the meantime I shall be happy to supply any further information.—I am, yours, &c., EDWIN COCKING, *Hon. Sec.*

57, *Queen's-road, Peckham, S.E., October* 7, 1874.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—Will you kindly allow me, in reply to the query in the *Foreign Notes and News* in the last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, to state that the Photographers' Benevolent Association in England has an employment register, which is exhibited by nearly all the principal dealers in photographic goods in England. As members have to give references before joining, it follows that all *employés* on the register are competent and of good character.

As the Association advances various means whereby employers and employed can be benefited will develope themselves, and will be adopted by the board of management. It is, therefore, hoped that photographers (amateur and professional) will help us forward and enable us speedily to get a firm hold. Meetings are held at 174, Fleet-street, on the first Wednesday in each month, when every visitor can take part in the general business of the Association, and offer any suggestion he may think fit.—I am, yours, &c., W. T. WILKINSON, *Secretary.*

174, *Fleet-street, October* 6, 1874.

ON THE PREVENTION OF "BLURRING."

To the EDITORS.

GENTLEMEN,—Will you kindly allow me space to venture a few remarks upon the experiments detailed in your sub-leader last week. Canon Beechey suggests that the rays of light passing through the film and glass are reflected *at right angles* from the back surface.

Setting on one side for a moment the diffractive power of glass, this can only happen in the case of the central pencil, the more oblique rays suffering reflection at an angle equal to the angles of incidence. Thus the nearer such pencils approach the edge of the plate, the greater must be the departure from the perpendicular on the part of the reflected rays. But it is well known that a pencil of light on passing through a plate of glass suffers diffraction—that is, is bent out of its course to a certain extent—and in the case of a ray reflected from the inner surface of a dry plate this bending will occur twice. Now it is evident that there can be only one point in the radius of a circle of rays where the angle of incidence coincides with the angle of diffraction, and this will be the only point where the ray will be reflected in a direction perpendicular to the surface of the plate. Though incorrect in theory, I can easily understand that the silvered glass may to some extent mitigate the defect of blurring.—I am, yours, &c. IGNOTUS.

October 7, 1874.

COPYRIGHT.—At the Bow-street Police Court, on Wednesday, the 30th ult., Mrs. De la Rue, art dealer, Museum-street, was summoned for infringing the copyright of Mr. Arthur Lucas in a photograph entitled *On the Track.* Mr. G. Lewis, Jun., prosecuted, and Mr. Longstaffe defended. The picture in question was painted by Mr. H. B. Roberts, member of the Institute of Painters in Water Colours. The copyright was sold to Mr. Lucas, and he had registered it. Some photographs of the picture taken by him have been published. From an advertisement it was discovered that the defendant was selling some scrap photographs, entitled *On the Track.* One of them was bought, and it proved to be a photograph of a bad copy from Mr. Roberts's picture.—Mr. Lewis called Mr. Roberts, who stated that he had painted the picture for the Royal Academy. It was there exhibited on the "line," and was much admired. He sold the copyright to Mr. Lucas. The photographs which had been sold by the defendant were evidently photographs of a very bad copy of his picture, and they were calculated to do him very great injury.—Cross-examined by Mr. Longstaffe: He did not copy his pictures from any French artist's painting. It was drawn from real models, and the dresses and arms had been lent him from a club of which he was a member.—Mr. Longstaffe, for the defendant, stated that, after this evidence, he had made an arrangement with Mr. Lewis by which the summons could be withdrawn. His client had bought a picture in France as original. She believed it to have been painted by an artist named Le Brun. This picture had been photographed, and she had sold copies for some months in the belief that the picture she bought in Paris was original, and that there was no other like it in the world. After what Mr. Roberts had said, however, it was evident that it must have been a copy she bought in Paris, and she was therefore quite ready to give up the negatives and promise not to sell any more of the copies.—Mr. Vaughan said this was, no doubt, the honourable course to take. The copies sold by Mrs. De la Rue were evidently calculated to do Mr. Roberts an injury, as they were copies of a very inferior picture to that by him. In the event of the negatives being given up the summons might be withdrawn.

PHOTOGRAPHIC IRRADIATION.—I hope you will allow me space to correct a slight misunderstanding which has got into the present discussion on photographic irradiation. Mr. Crofts places my views in opposition to those of Lord Lindsay and Mr. Ranyard. Mr. Stillman, who has given us such valuable information on the molecular condition of different preparations of collodion, also takes the same view. Now in reality Lord Lindsay's and Mr. Ranyard's views are not opposed to mine. I have simply attempted to prove that molecular reflection was *a cause* of photographic irradiation, not that it was *the only cause*, as I quite agree with Lord Lindsay and Mr. Ranyard that the imperfections of the lens are also causes of photographic irradiation, and in *Nature*, vol. x., p. 185, I pointed out one form of irradiation due to the lens. But the imperfection of the lens which is most fatal is that pointed out by Lord Lindsay and Mr. Ranyard, namely, the inability of the lens to bring all the rays to a focus, whether this results from the imperfections of the outside portion of the lens or from imperfect achromatic* correction. No maker of lenses will tell you that any lens, far less that every lens which he puts out, is perfectly corrected for dispersion. Working with such an instrument it is very clear that, if we only allow an exposure sufficient to give an image on the part of the collodion where the great proportion of the rays are focussed, then the photographic impression will give very nearly the true boundary line. But suppose we allow more light to pass through the lens, either by turning the camera to a brighter light or by giving a longer exposure, then it is clear that the unfocussed rays which gave no impression when the exposure was short will now impress themselves on the collodion, and thus the photographic impression will be extended beyond the true boundary line. That there should be difference of results in experiments on photographic irradiation is quite to be expected, as there are so many variables in the experiments. The light, temperature, and condition of the collodion are all constantly changing, and the conditions under which the experimenters work, and the apparatus and chemicals used, are different for each experimenter; different results may, therefore, be expected. If the experimenter use a good lens, and employ only the central portion of it, the imperfection due to the lens may be small in quantity. But if his lens be imperfectly shaped and badly corrected for dispersion, and he uses the full aperture, the result will be very different. Again: if the experimenter work with different collodions Mr. Stillman has shown that, altogether independent of the lens, a very slight change in the preparation of the collodion greatly alters the amount of irradiation. So far as I can at present judge, the imperfection of the lens and molecular reflection are not opponents but allied enemies, which we must meet on the same field.—JOHN AITKEN, in *Nature.*

* We here require some new word or we must greatly extend our conception of achromatism, as we have here to deal with rays far beyond the limits of the sensitiveness of the eye; and the word "achromatic," as applied to lenses for chemical purposes, is somewhat misleading. I may here offer two suggestions as to how the imperfect power of the lens to bring all the different rays to a focus may be partially corrected:—(1) By using a collodion which is as nearly as possible only sensitive to those rays which the lens can bring to a focus; or (2) by providing each lens used for making accurate observations with a screen, which shall stop back all the rays beyond the limits which the lens can focus.

EXCHANGE COLUMN.

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

I will exchange a cabinet rolling-press, double geared (top roller and plate nickel plated), for a Harrison's head-rest in good order, or offers. Photograph of press sent if required.—Address, W. Dakin, photographer, Nether Edge, Sheffield.

Having a choice selection of stereoscopic views of *Mauch Chunk*, Pennsylvania, the Switzerland of America, I would like to exchange stereoscopic views with anyone having stereoscopic or larger views of general interest. Send sample of photographs.—Address, F. G. Adams, 216, North Tenth-street, Philadelphia, Pa., U.S.A.

ANSWERS TO CORRESPONDENTS.

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

James Young.—"Schlippe's salt" is a synonym for sulphantimoniate of sodium.

Gorgon.—Bates's black, with an addition of lampblack, will answer for the brasswork.

B. B. O.—Not one of the modifications of the developer mentioned by you are now in use.

J. C. Stevens.—Thanks. Sal soda is merely another name for ordinary washing soda.

F. Harding.—Macintosh cloth is quite light-tight, if good. At any rate, all the samples we have seen were thoroughly opaque.

F. G. Adams (Philadelphia).—No charge is made for exchange notices. The post-office order referred to by you was not enclosed.

Micros.—If you try the effect of a concave lens, instead of the ordinary eye-piece of your microscope, you will obtain greater enlargements.

Nemo.—Messrs. Benerman, Wilson, and Hood, of Philadelphia, are the publishers of the work about which you inquire. We do not know the price.

Ag.—The "company" is at present in difficulties, and will, we think, be soon defunct. We are perfectly aware of the arrangement to which you allude.

G. Gray.—Cyanogen soap, from its very constitution, is necessarily as poisonous as cyanide of potassium, and should be used with the same degree of care.

A Constant Reader.—You have been napping. We have had two articles upon the topics inquired about within the past three months. To these we refer you.

W. Wedd (Mount Gambier, S.A.).—Your favour of August 10 to hand. Kindly remit 9s. 10d., which amount will cover your subscription to the end of current year.

Vandyke and Brown (Liverpool).—Our correspondents are thanked for two charming *carte* portraits of A. Barclay Walker, Esq., the mayor of Liverpool and donor of the New Art Gallery.

Inquirer.—If you place a small lump of chalk in your hyposulphite of soda solution there will be no fear of its becoming acid. This expedient has been resorted to by several photographers.

Baynham Jones.—The information concerning the gumming of the backs of stamps is promised; but the method of mounting suggested by you has been patented within the past few months.

J. B. R.—1. Schlippe's salt cannot be obtained in your country. See another "Answer" on this subject.—2. Washing soda.—3. Not in Europe. You will find all that is valuable in our columns.

Query.—This correspondent asks—"What is the *methylated spirit of nitric ether* recommended by T. N. in his article *On Cleaning Plates* in last number?" Will T. N. give the information required?

B. J.—The back lens of the combination will, if used alone, with the stop at a distance of three inches in front, cover a 25 × 20-inch plate quite well. Of course the front lens will act in similar manner to the back one.

One in Trouble.—The stains in the prints consist of sulphide of silver, probably caused by the paper having been handled by some assistant whose fingers have been moist with a solution of hyposulphite of soda.

John Symon.—A good stereoscopic transparency will not answer *well* for the lantern on account of its density. Stereoscopic pictures should always be much more intense than those intended for enlargement in the lantern.

Auld Reekie.—By placing a sheet of roughly-ground glass over the negative, and at a little distance from it, the light will be so diffused as to render the effect of the crack in the negative much less visible than if printed in the ordinary way.

Cadmium.—Wash the paper with a solution of oxalate of iron and ammonia, dry, and expose under a negative for ten minutes; then develope by brushing over the surface a weak solution of ferridcyanide of potassium to which a little gum arabic has been added.

C. L. Law.—There is no anomaly whatever. A mixture of the solutions of pyrogallic acid and protosulphate of iron will undoubtedly produce a black precipitate, as you observe; but, by again reading the article, you will find that a certain proportion of nitric acid has also to be added. This keeps the solution clear and colourless.

Sigma.—In using a copying camera of such great length as yours it will be necessary either to have it placed upon two stands—one at each end—or upon a solid table of suitable dimensions. To produce with your lens an enlargement from the negative marked *b* up to that capable of being made in your camera the ground glass must be eight and a-half feet from the centre of the lens.

B.A.—Oxymel consists of a solution of honey in diluted acetic acid. To use it photographically, wash the plate after removal from the silver bath, and apply the oxymel in a greatly-diluted form, causing it to flow over the whole of the surface. Plates preserved in this way are very slow, although they yield clean pictures. The oxymel process is not a "dry" one.

C. Green.—The alleged invention that was so foolishly credited by the *Daily Telegraph* to Mr. Mayall, viz., that of causing the shadows to fall upon the face of the sitter according to the way by which the cap was removed from the lens, is so transparently absurd that we are surprised you could for a moment have imagined there was anything in it.

E. T.—1. We cannot understand from your letter what kind of a lens you have, but imagine it must be one of Goddard's. This optician has constructed several lenses of very curious forms. If you will send it for our inspection we shall then be able to tell you more about it.—2. The circle of light depends entirely upon the relation existing between the diaphragm and the lens.

Katie.—We advise you to have nothing to do with a Dubroni's apparatus, as it is only a toy, and is quite unsuited for the purpose for which you require a camera. We do not, of course, assert that pictures cannot be taken by the agency of such an apparatus, for we have proved that they can; but, notwithstanding this, we strongly advise you to keep to your own stereoscopic camera and developing box.

Indian.—1. The English equivalent is Beaufoy's acetic acid, which is much weaker than the glacial acid.—2. The colouring of the shadows is very annoying; but without entering upon the *cause*, seeing that is not quite clearly made out, we may suggest as a remedial measure the *thoroughly* washing out of the fixing agent, should the negative be fixed previous to intensification. Washes of a solution of iodine, followed by a weak cyanide solution, will remove the discolouration; bichloride of mercury also proves useful in this respect.—3. We refer you to our advertising columns.

Received.—J. Beattie. In our next.

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

Obituary.—At Falmouth, on the 30th ult., James Frederick Trull, photographer, aged 45 years.

South London Photographic Society.—With reference to a notice concerning the Technical Exhibition of this Society that appeared in our last, we have to announce that this meeting, instead of being held on the 15th inst., is postponed to a later date, particulars of which will be given in our next. We take this opportunity of referring those of our readers who intend to exhibit to the letter of Mr. Cocking, the Honorary Secretary, in another page, and hope their contributions will be in readiness for this interesting exhibition.

METEOROLOGICAL REPORT,

For the Week ending October 7, 1874.

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

These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
1	29·52	SW	57	60	68	50	Dull
2	29·55	SW	51	53	60	45	Raining
3	29·40	W	45	47	60	40	Fine
5	29·96	W	42	45	67	37	Cloudy
6	30·05	SW	45	49	57	36	Dull
7	29·39	WSW	55	56	—	44	Raining

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 754. Vol. XXI.—OCTOBER 16, 1874.

THE NEWEST PHOTOTYPOGRAPHIC PATENT.

It is probable that we should not have taken any special notice of the patent obtained by Mr. Banks for producing surface blocks for printing, described in our Journal for September 25th, had we not incidentally heard that the holders of that patent have given notices of warning to publishers respecting the consequences that will ensue upon their encouraging what they call "piracies" of Mr. Banks's invention. Indeed, unless we have sorely misunderstood our informant, *criminal* proceedings are threatened against infringers of the patent. This leads us to examine more particularly the patent itself, which we shall do without being in the least degree influenced by several readers who have expressed an opinion that there is nothing new in the patent.

The invention of Mr. Banks may be divided as follows:—First, the production of a relief surface in gelatine, from which a cast suitable for printing may be taken either by one or more operations; secondly, the hardening of the gelatine relief surface so as to render it easier to obtain a cast therefrom; and, thirdly, the production of the cast.

In the first division we cannot refrain from noticing a statement in the specification which will make many wonder, namely, that in which it is said that gelatine is soluble in "cold water;" for we venture to affirm that it is the first time our readers, especially those who have paid any attention to the subject of gelatine in connection with photography, have heard of such a thing. Gelatine only swells in cold water; to dissolve it hot water is required. Some impure matter sold as gelatine may, possibly, dissolve in cold water; pure and good gelatine will not.

The relief surface is obtained, by preference, by coating a plate of glass with gelatine, sensitising it by immersion in a solution of bichromate of potash, exposing under the negative, and then placing it in water to swell. So far this is all right. It was first patented by Herr Paul Pretsch, followed by many others; it has been described over and over again in these pages, and minutely-detailed working directions and proportions have been given. Hence, up to this stage, the last new patent is rather behind the times. But a modification is made in this aqueous swelling bath. Instead of plain water Mr. Banks adds a little iodine to it (ten grains to the quart), following up this treatment by placing the swollen plate in a bath of water rendered alkaline by the addition of ten drops of ammonia to each quart, and subsequently in a third bath of water acidified with acetic acid (half-an-ounce to the quart).

The object of this, it is said, is to harden the edges of the design which have not been raised up. Now, we have an observation to make upon these complex alternating washes. First of all, most excellent printing-blocks have been and always will be obtained from gelatine that has been swollen by water alone. A relief produced in this way proves to be quite hard enough to admit of either electrotypes or plaster moulds being taken from it without the slightest degradation of the finest lines; in proof of which we have obtained relief impressions in copper of typographic reproductions on such a reduced scale as to necessitate the use of the microscope to enable us to read the print, every letter and line being thus rendered perfectly. This complication is, therefore, not really required; but if hardening of the surface be desired, so as to enable it to stand any undue degree of wear and tear, what simpler and better means can be conceived than those first published by Mr. Woodbury, viz., either applying a wash of weak alum water to the gelatine surface before taking the cast in plaster of Paris, or mixing with the plaster a little solution of alum in lieu of plain water? This method is now adopted by several; we have used it with excellent results, but it is not patentable, having been published long since, and many beautiful works, especially in photomicrography, have been produced by its agency.

Up to this stage, therefore, of obtaining a gelatine relief ready for converting into a plaster cast no claim for novelty will, we imagine, be made out on behalf of this patent. We have, however, overlooked the fact that hydrate of lime is added to the bichromate sensitising solution, in the proportion of half-a-drachm to a quart of the solution. We willingly give the credit of this addition to the patentee; but inasmuch as a very great amount of sensitiveness, all the relief required, together with microscopic sharpness, result from preparations long known and practised without let or hindrance, it is not at all probable that any of the trivial modifications adopted by the patentee will be imported into the practice of others, more especially as they form the basis of a claim for a patent.

A special claim made by Mr. Banks is the subjecting of the plaster to pressure just at the time of setting, so as to secure contact with the gelatine relief. This may be good, but it appears somewhat clumsy, seeing that an excellent mode by which to obtain all the sharpness which can arise from intimate contact with the mould is to apply a little thin plaster prepared as we have described, brush it well into the details of the surface by means of a camel's-hair brush, and when that has slightly set to apply a larger quantity as a backing.

Another special claim is made for producing an electro cast. From the gelatine relief a plaster cast is obtained; from that plaster cast a wax impression is taken; from which, again, after being rendered "conducting" by means of the fumes of mercury, an electrotype is produced.

Compare this with the beautiful simplicity of the method described so minutely by Mr. M. Carey Lea in our Almanac for 1866, in which a thin film of pure silver is deposited upon the surface of the gelatine mould itself.

We do not require to go any farther into the merits of this patent; but we wonder what the Vice-Chancellor would say, should any action for infringement arise, if that item in the third claim were gravely put forth wherein it is said—"I also claim taking a cast from the plate, as herein described, without removing the gelatine from the glass;" because, in point of fact, a cast is never taken under any other circumstances.

We imagine the claims set forth in this patent will have provoked a smile from numerous "old stagers" in the wide field of phototypography. How it is that patents for such well-known processes are applied for at the present time appears to us quite inexplicable.

THOUGHTS SUGGESTED BY THE CHICAGO CONVENTION.

Does anything remain to be done to further the interests of photography? We think a great deal. Not, however, in the direction of apparatus; for we believe our optical and mechanical appliances are as nearly perfect as we may ever expect to see them. Neither do we think that much is to be looked for by way of addition to our chemical resources—in the meantime, at least. No doubt in this direction there is yet a wide field open to those who have time, inclination, and ability for original research; but the photographer who possesses the knowledge of properly utilising the material we have can produce results of the very highest class, both as regards beauty and permanency. One thing we want, then, is the more general spreading of this knowledge of how to make the best use of the material at present available. No doubt photographic societies have done something, and photographic literature has done more, in this direction; but that much yet remains to be done is abundantly proved by the frequent eager inquiries after the special formulæ of successful operators, and the support which seems, even yet, to be given to the dealers in secret nostrums.

The work of the photographic societies, notwithstanding the publicity given to it by the photographic journals, is apt to be but local in its influence. "As iron sharpeneth iron," so does the bringing of men face to face elicit much that might otherwise never have seen the light; and as brilliant sparks are evolved from the flint and steel, so from the personal intercourse of kindred spirits, having similar objects in view, but, perhaps, trying to gain them by different routes, there frequently results much of the highest value to both, which is too subtle to be caught by the reporter's pen.

That these observations apply to other subjects as well as to photography is shown by the fact that the want has been felt and, to a large extent, supplied in most other branches of science. In this way have arisen the British Association for the Advancement of Science, the British Medical Association, the Social Science Congress, the Pharmaceutical Conference, and last, though not least, the American Photographic Convention. Whether our own country is ripe for the successful carrying out of such an association, purely devoted to photography, we do not know; but we think it is well worth a fair trial. It has been mooted more than once, but no active steps have as yet been taken to give it the necessary start. It has, no doubt, been urged, by way of objection, that in the British Association we have every necessary opportunity of introducing photographic subjects, and that extremely little of photographic interest has ever been introduced; but we think the argument of comparatively little value, as, in the midst of many subjects necessarily discussed there, photography, almost in consequence of its claims to be regarded as an art, is apt to "go to the wall." In an association, however, devoted almost exclusively to photography this could not occur; whilst the mere fact of its existence and arrangement to meet in any particular town would create an enthusiasm which could not fail to be of the utmost benefit to all concerned and to the art generally.

We have had some experience of the doings and effect of the Pharmaceutical Conference, and know that previous to its establishment the members of that profession, even those living in the same city, were on little more than "bowing" terms, while of those in other cities they knew nothing unless, perhaps, the names; and, as a matter of course, the profession itself either stood altogether still or made the slowest possible progress. Now, however, the motto of the pharmaceutist is "progress." He has seen and conversed with most of the higher lights of the profession, and finding that they were only men like himself, but who by study and application had gained their envied position, has resolved to go and do likewise, thereby adding greatly to his pleasure and profit. Nor do the benefits end here. It has almost universally been the case that in the various towns in which meetings have been held the temporary committees have resolved themselves into permanent societies from which much valuable work has emanated, not the least important being the joining of the many units into one harmonious whole, increasing their respect for, and confidence in, each other, giving opportunities of increasing their knowledge by intercommunication, and, what some will consider better still, enabling them to increase their too small fees by, in some cases, fifty per cent.

We do not say that all these benefits would necessarily flow from the institution of such a photographic association, but we are sanguine enough to deem the subject worthy of consideration.

In addition to the more manifest benefits that might be expected to flow from a photographic association of the above character, there are others which may be called collateral that would frequently occur. Of such we have an example in the extracts which we have published from the replies to the request of the editor of *Anthony's Bulletin* that the successful exhibitors at the Chicago Convention would furnish him with their formulæ and methods of working. Those replies afford an excellent lesson to many who need it much, and we hope they will be profitable to those who are continually running after something new, and who are disposed to put their trust in matter rather than in mind.

Of those extracts which we have published, few indeed of the writers seem to attribute any particular influence to the materials with which they work. Of these one attributes his success to a weak bath of from ten grains, made very acid, and to a chloride instead of a bromide in his collodion. Another thinks nothing less than a forty-five-grain bath will do; while a third, having at the Buffalo Convention "satisfied all thinking minds that colours are of different *focal* lengths," gives each colour "a special lighting and special chemical treatment," in addition to his working in the "steepest skylight in the West" with his "actinic screens." The skylight of another, if not the steepest, must surely be the highest, as it is thirty-seven feet from the floor, and he produces his fine effects by iodising his collodion to suit the height of his room. The remainder are like the classic knife-grinder—they have "no story to tell," except the oft-told, but by many still doubted, tale—"care and skill," "care, cleanliness, and judgment," "work and experiment," "judgment in lighting, and careful manipulation in the dark room," and, lastly, "with me it is more pleasure to make pictures than to work for money." In this latter statement lies, we think, one of the great secrets of success, and we think, also, that the man who conscientiously so feels and acts will not only produce good work, but will find that good work pays best.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

[First Notice.]

The nineteenth annual Exhibition of this Society was opened on Tuesday evening last by a *conversazione* in the Suffolk-street gallery, there being a good attendance.

It had been found impossible to adhere to the rule of opening the Exhibition on the second Tuesday in November, for at this time none of the picture galleries in London happen to be available, and the date ultimately fixed upon was that alone which chimed in with other existing arrangements. The gallery which the Society occupied las year is now undergoing reconstruction, and is at the present time in the hands of the builders. Conduit-street gallery was likewise not available.

There is an excellent collection of pictures, and in our opinion there is, to speak negatively, no falling off in respect of quality from the works exhibited in previous exhibitions. We are glad to see, among those who contribute, the names of several artists who have of late years been conspicuous by their absence from these exhibitions, but of whose works we hope, in this connection, to see more in future, among them being Messrs. G. W. Wilson, Vernon Heath, Jabez Hughes, F. Frith, and others. On the other hand, we have to regret the absence of a few by whose works previous exhibitions have been enriched. Among these is Mr. Russell Manners Gordon (who now resides in Portugal), from whom we have just received a note, in which he states that, owing to the alteration of the opening to an earlier date, he will have nothing ready in time.

The portraits entered in competition for Mr. Crawshay's prizes are not so numerous as last year, but among them are some really fine works.

We may at this stage intimate that the Crawshay awards are as follow:—

1. A prize of £50 for the best collection of three photographs of heads, taken direct from life, the size of the picture being not less than 20 × 16 inches, and the head not more than eight inches nor less than seven inches from the top of the forehead to the bottom of

the chin. Pictures measuring more than one inch under or over 20 × 16, and heads under seven inches, will be disqualified. The prize for the best heads in accordance with these conditions is awarded to Messrs. Chaffin, of Yeovil, Somersetshire.

2. A prize of £25 for the second best collection of three photographs of heads, as above. This was awarded to Mr. Crawshay himself; but when it was understood that he would not accept it Messrs. Robinson and Cherrill received it, as being third best.

3. A prize of £25 for the best collection of three photographs of heads taken direct from life, the size of the picture not less than 15 × 12 inches, the heads not less than four and a-quarter inches from the top of the forehead to the bottom of the chin. Pictures more than half an inch under or over 15 × 12, and heads under four and a-quarter inches, or more than half an inch over four and a-quarter inches, will be disqualified. This prize was awarded to Messrs. Robinson and Cherrill.

4. A prize of £12 for the second best collection as above. Mr. Slingsby, of Lincoln, received this prize.

5. A prize of £25 for the best enlargement, not less than 20 × 16, by any method. Mr. Ferranti, of Liverpool, received the prize for the portrait of a lady finished in the manner patented by this gentleman.

The prizes offered by Mr. Crawshay for landscapes were as follow:—

1. For the best three landscapes of any size not less than 10 × 8, £25. This prize was awarded to Messrs. Robinson and Cherrill.

For the second best three landscapes as above, £12. Awarded to Mr. W. D. Sanderson, of Manchester.

2. For the best landscape of any size, £10. Messrs. Robinson and Cherrill.

For the second best landscape of any size, £5. Mr. W. D. Sanderson.

The number of those who competed for the Crawshay portrait prizes were:—For direct large heads, eighty competitors, including Mr. Crawshay; enlargements, five competitors.

We are a little uncertain as to the prize awarded to Mr. Ferranti, because he has already published in our pages the fact that he has all his enlargements made and printed in carbon by Messrs. Spencer, Sawyer, Bird and Co. The prize, therefore, is given, we presume, for the best mode of *finishing* enlargements, rather than for the best mode of *producing* enlargements or for the best enlargement. It will hence be seen that of the numerous contributors to the Exhibition only very few entered as competitors for the Crawshay portrait prizes.

We now come to the Exhibition of the Society as distinct from those works exhibited in competition as above alluded to.

There are numerous enlarged landscapes in the Exhibition by Messrs. Spencer, Sawyer, Bird and Co., and by Mr. B. J. Edwards. These will afterwards warrant us in opening up the question as to how far it is wise for photographers to take large direct landscape negatives.

Commencing at the beginning of the catalogue, several portraits exhibited by Mr. Vanderweyde are interesting as examples of stippling by his process.

Mr. England shows a choice collection of photographs from statuary in the International Exhibition at present open. Being sole photographer in the "International" Mr. England has exceptional facilities for reproducing works of this description.

Those who desire to know what can be effected in expression must study a frame containing about forty examples by Mr. O. G. Rejlander, which will amply repay minute inspection.

Mr. Blanchard exhibits largely, his pictures—portraits of large dimensions—evincing the well-known care of this gentleman.

As usual, it is a matter of great difficulty to decide which of Mr. William Bedford's fine landscapes is best, all being excellent. The *River Scene at Aberglaslyn* (22), *Dinas Lake* (25), and *Scene on the Dyryd* (30), will probably prove the chief favourites.

Mr. Young, Llandudno, exhibits several large portraits of unmistakable merit, his pictures, *The Bouquet* (35), and a *Portrait* (39) being good examples of fine work.

The beauty and delicacy of Mr. Frank Howard's landscapes are well known to many in the metropolis. In the frames numbered 43 and 44 are to be found some pictures of great merit, the *Old Cottages, Chalgrave*, being a veritable gem.

Mr. F. Beasley exhibits several fine pictures, which, unfortunately, have been scattered about the room. Mr. Beasley's work is characterised by perfection of delineation in the minutest details.

Among several good pictures by Sir Thomas Parkyns, *The Three Bridges near San Remo* (54) is an excellent example of this artist's works.

Mr. Abel Lewis well sustains his reputation. We specially direct attention to a charming portrait of a child holding in her hand a basket of flowers (56).

We shall resume our notice next week.

In the advertising columns of our number for the 21st August appeared an announcement relating to the formation of the "Illustration Company." We bespeak for this company the favourable consideration of those of our readers who feel an interest in the publication of their works. It is now well known that numerous books and illustrated magazines owe their illustrations, to a considerable extent at least, to photography; and one object of the formation of the Illustration Company is to provide a means of communication between the artist or photographer and the publisher. As a preliminary step they urge upon photographers the desirableness of having pictures of a nature suitable for publication, and of protecting their works from piracy by entering them at Stationers' Hall, which they, in common with the publishers of the existing photographic journals, will be glad to undertake. They have arranged to keep at their offices (210, Strand) a list of such works entered since the date of the formation of the company. They will issue permission to publishers to engrave any pictures they may have control of, and altogether hope to facilitate that intercourse which ought to exist between photographers, engravers, and publishers. The company has our best wishes for its success, and we shall take early occasion to give some further details concerning its operations.

THE SENSITIVENESS OF IODIDE OF SILVER.

Having in the early part of the present year been experimenting in pretty much the same direction, I read with considerable interest Mr. Sutton's article in your number of 10th July last, *On the Comparative Sensitiveness of Iodide, Bromide, and Chloride of Silver to White Light in the Various Negative Processes;* and if not now too late I should like to make some observations thereupon, want of time having previously prevented me.

Mr. Sutton lays it down as an axiom that free nitrate of silver is essential to the formation of an image upon iodide of silver—and this, I suppose, has hitherto been the opinion of photographers generally—and states in reference to iodide of silver and alkaline development that "not a trace of an image can be obtained in this way." I myself, also, for a long time held the same view; but, not having been able to satisfy myself *why* it should be so, I determined thoroughly to investigate the matter, and very soon found that such an idea was altogether erroneous. *Free nitrate of silver is not essential to the formation of an image upon iodide of silver*, and this Mr. Sutton or any other of your readers may prove for themselves in the following way:—

Coat a plate with simple iodised collodion (or bromo-iodised, as the small proportion of bromide usually contained in commercial samples of collodion will probably not materially affect the result), and immerse it for five minutes in an ordinary negative bath of thirty or thirty-five grains strength, which will be amply sufficient time, I think, to complete the chemical changes, unless the collodion be of a more than usually horny character. Then, after thoroughly washing with water, immerse for another five minutes in a strong solution of common salt. The quantity of salt is not very material; the solution may be saturated if you will, though in that case you must expect some pinholes in the first few plates. Now remove, well wash again (or leave it alone, just as you think proper; salt or no salt makes very little difference to the subsequent exposure and development), and expose for about the same time as for an ordinary wet plate—a little longer, if anything, though I may as well, perhaps, remark here that plates may be prepared practically quite as sensitive as ordinary wet ones by using a more dilute solution of salt, a strong solution being recommended in the present instance merely in order to demonstrate that free nitrate has nothing whatever to do with the result—and develope as follows. Make a solution of—

Caustic potash	60 grains.
Iodide of potassium	5 „
Water	1 ounce.

Place sufficient of this in a developing glass to cover the plate; then add some pyrogallic acid (which readily dissolves in the solution), stir up, and pour on to the film. The image will speedily appear, and as soon as it does the developer should be washed off as quickly as possible, otherwise the plate might be fogged by the reduction, more or less complete, of the unimpressed portion of the film. The development, however, can be brought completely under control, either by increasing the amount of iodide of potassium (but to which, of course, there is a limit, owing to the well-known property that salt possesses of dissolving iodide of silver, and which might, consequently, injure the image), or by reducing the amount of caustic potash.

By reflected light the image shows as a negative, but by transmitted light—supposing the plate to have been properly exposed and developed—as a positive, owing to the superior density of the unreduced iodide. After fixing these appearances are, of course, reversed, but the image will require considerable intensification for printing purposes; nor (although I do not say so positively) do I think that this can readily be dispensed with, the fact appearing to be that iodide of silver contains too little metal in proportion to the bulk of the salt to form a sufficiently dense deposit.

I send you a specimen of a negative taken in this way, which, as you will observe, was not intensified, and which differs little or nothing in appearance from an ordinary wet-plate one; and also one which after development was treated with a solution of nitric acid, which dissolved the silver deposited from the reduced iodide, and left, as you will perceive, a positive picture of unaltered iodide.

Seeing that the above method of developing an iodide plate does not seem to have been known to so high an authority on photographic matters as your contributor, Mr. Sutton, I presume I shall be entitled to the credit of being the first to publish it; but with regard to the following observations I am not sufficiently well acquainted with photographic literature to say how far they may be original. Probably much of what I say is well known, but, however, you are quite at liberty to publish them for what they are worth.

Premising, then, that I do not wish to state anything too dogmatically, experience having taught me the folly of so doing, I would remark, in the first place, that the results of a long series of experiments have convinced me that it is highly desirable (not to say essential) to the successful working of alkaline development that the film should contain some uncombined soluble haloid salt, such salt appearing to me to occupy pretty much the same place in alkaline development that acid does in the ordinary method. The absence of the soluble haloid in the film may, to a certain extent, be compensated for by increasing the quantity in the developer, just as an increased amount of acid in the developer will compensate for the want of it in the bath in the ordinary process; but as in that process the best results are obtained when the proportions of acid in the bath and developer are nicely balanced, so in the alkaline method the most satisfactory results are obtained by a nice adjustment of soluble haloid in the film and in the developer.

This, then, is the reason why in the preceding experiment I direct that the plates should not be washed merely—which, if well done, would answer every purpose as far as the removal of the free nitrate is concerned—but should be afterwards treated with a solution of common salt.

Secondly. That of the three kinds of haloid salts at our disposal iodides are the most energetic in restraining the action of the developer and destroying the sensibility to light, and chlorides the least so, iodides occupying pretty much the same position as nitric, and chlorides as acetic, acid in the ordinary process. Hence I prescribe common salt for the film as being least likely to injure the sensitiveness, and iodide of potassium for the developer because it has the most restraining power. But, as will, no doubt, readily be inferred by any intelligent reader, an iodide or bromide salt may be substituted in the film, though in much more dilute solution (especially if iodide), if it be desired to preserve the sensitiveness, than the chloride; and a bromide or chloride salt in the developer, in that case (especially if chloride), increasing the amount of the salt.

Thirdly. That of the three haloid salts of silver used in photography iodide is the most, and chloride the least, susceptible of injury by the after-treatment with a soluble haloid; in fact, if iodide of silver be treated with a solution of iodide of potassium sufficiently strong, I believe it will be found to be practically valueless for camera purposes, although I am not prepared to go the length of some, and say it is absolutely insensitive to light. Consequently, the amount of free soluble haloid required in the film will depend upon the kind of silver salt, and also, I may add, to some extent upon the strength of the nitrate bath used to form it.

I may as well, perhaps, here state that the after-treatment with a solution of soluble haloid is not by any means essential to success; for, if the plate be removed before the completion of the chemical changes, supposing the collodion to contain only one kind of salt, or if a small proportion of some salt—as, for instance, a bromide or chloride to an iodide—in which the chemical change is not so readily effected, be added to the collodion (the formation of the iodide being allowed to fully complete itself), then it will be sufficient simply to wash the plate before exposure and development. Hence, if any of your readers should try the iodide development experiment with a bromo-iodised collodion, and find any difficulty in the development, they will guess at the cause.

Fourthly. I am strongly of opinion (and I see Mr. Sutton hints at the same thing) that the most sensitive salt of silver is the chloride, bromide (with alkaline development) occupying an intermediate place, and being certainly, whether ordinary photographers like to admit it or not, much more sensitive than iodide in any form. But here (that is, with the chloride) we are confronted with a new difficulty, namely, its excessive tendency to pass into the state of subchloride under the action of the alkaline developer. A chloride film prepared in a similar way to the iodide, as previously described—though, of course, using a much stronger sensitising bath—and then developed with a very weak alkaline developer, will be found to give a distinct image with a very brief exposure to light; but any attempt at intensification by increasing the strength of the developer will speedily spoil the whole thing, reducing the entire film to the state of subchloride. If the development could only be brought under control, I believe, I say, that the chloride will be found to be the most sensitive, as well as the most satisfactory in every respect, of any photographic process with which we are yet acquainted.

William Robinson.

P.S.—Mr. Sutton also affirms, I perceive, that in the case of silver the ordinary chemical affinities of chlorine, bromine, and iodine are reversed, the latter possessing the strongest, and the former the weakest, affinity for that base. This opinion, I presume (although not having seen Mr. Sutton's two previous papers I do not know for certain), is based upon his want of success in developing iodide of silver by the alkaline method. As I have now, however, pointed out how this may be done, I trust Mr. Sutton will see his way to modify his opinion on this point, as it is certainly not in accordance with my experience, nor do I think such a view is generally held.—W. R.

THE DISINTERMENT OF THE DAGUERREOTYPE PROCESS.

The season is now rapidly approaching when work in the studio and in the field will be brought comparatively to a standstill in this country, and when photographers, less busy than usual with their hands, will have more time for thought and study.

Many questions will then crop up for serious consideration. Is the studio built on a good principle as regards light, heat, and ventilation? Are the processes and appliances in daily use such as the present state of the art-science justifies? Is improvement in any respect possible in any direction? The season is approaching when questions of this sort will naturally occur to the mind during hours of leisure, and when we must seriously consider whether we have become foolishly bigoted to any bad habits or modes of operating; whether we have turned our backs upon anything really good; whether we have persevered in any wrong course; whether we have been blindly prejudiced in favour of any pet process or contrivance or mode of doing a thing.

I was glad to see in the last number that a French *savant* has lately recommended the employment of the process of Daguerre in astronomical photography, and that some reasons were advanced why that fine old process might possibly be revived with advantage in other cases where dry collodion plates are commonly employed. Permit me to add a few observations on this subject.

Some years ago I was a pretty fair adept in the daguerreotype process; but although, like most other disciples of the camera, I gave it up in favour of paper and glass, still my thoughts have often wandered back to the marvellous perfection of detail and gradation which the silver plate affords, and in which respect it stands unrivalled. Surely, then, I cannot but think, there must be cases in which this highest attainable degree of technical excellence in photography must be desirable, irrespective of artistic effect. To the man of science the solid advantages which this fine process offers should be invaluable; whilst it really appears that it may be employed with advantage even in landscape photography, in affording a positive from which collodion negatives of any size can be easily copied. For portraiture, also, it will be appreciated by those who desire not so much an idealised resemblance as the literal truth.

I venture, then, to offer a few hints respecting the daguerreotype process, based chiefly upon my own experience with it a few years ago.

The plates should not be too thin in the copper, and the silver which is rolled upon the copper plate should be quite pure and unalloyed. For some purposes it may be found better and quite as economical to use plates composed entirely of pure silver. Glass plates, silvered by any of the good processes now in use for making mirrors, might answer the purpose, but there would be the risk of cracking them in the toning process over the spirit lamp. It is possible also that, unless the silvering was so thick as to be quite opaque, blurring might occur, as in the collodion process. I imagine also that the polishing of a silvered glass would be a rather delicate operation. A hemispherical silvered bowl would be suitable for a panoramic view, including a wide angle in *all* directions, such as could be successfully taken with a panoramic lens. Grand Alpine scenery would afford very suitable subjects for this treatment, and the results would be novel and interesting in the highest degree. Half-a-dozen such subjects well taken would be worth, in point of fame, years of ordinary work if, by some clever device, the pictures could be taken or viewed non-reversed.

On the subject of plate cleaning and polishing I have nothing new to say. The methods are as various as in the case of glass plates. The main point is to make the silver surface chemically clean, and to polish it to the utmost degree without scratching it by gritty particles, or showing coarse buff marks.

The iodine and bromine boxes should be kept separate, in order that the fumes may not mix. They should be made of glass, and have ground tops, covered with a close-fitting ground-glass lid.

The plate should rest horizontally over the mercury; and it may be lifted up for examination during the development, so that the mercury box need not have glass windows. This should, of course, be provided with a thermometer.

All the solutions used should be carefully filtered through bibulous paper. Black spots which come in toning may be removed by cyanide of potassium. The golden and purple bloom seen in good daguerreotypes is mainly due to the purity of the silver upon the plate. This process may be easily worked in a tent, and the plates may be fixed and toned at home, so that no solutions or water are necessary. The outfit for quarter-plates would be very light and simple if the entire apparatus were made for that size of plate only. I should, however, for my own use, prefer square plates.

The following important precautions must be taken in copying a daguerreotype. From the fact of its having a highly-reflecting surface it is evident that reflected light from surrounding objects is liable to be thrown upon the lens. Great care must be taken to avoid this; and it must be remembered that it is the rays falling most perpendicularly upon the plate which, after reflection, enter the lens, and not those which fall very obliquely upon the plate. An intelligent operator would not, therefore, willingly paint his camera white, nor work with a whitewashed wall behind it, nor dress himself in a white surplice for the occasion. He would prefer to wear a black velvet robe, to put a black screen behind the camera, to paint the front of his instrument black, and to cover the brass tube of the lens with something black; and, above all things, he would never place the daguerreotype with the sky full in front of it, and, therefore, immediately behind the camera. THOMAS SUTTON, B.A.

A FEW WORDS ON THE BEER AND ALBUMEN PROCESS.

[A communication to the Edinburgh Photographic Society.]

As I have had a good deal of experience this summer with this process and with modifications of it, I may be allowed to give my opinion of it, and also a short account of a set of experiments I have lately tried with the different forms of the process, in order to find out which was the best and most sensitive.

Mr. W. H. Davies, in a paper which he read before the June meeting of this Society (and from which I have taken my title) recommends the addition of more silver and pyrogallic acid to the beer and albumen. He says:—"If additional rapidity be needed it is conferred by increasing the proportions of free silver and gallic or pyrogallic acid, and cautiously reducing the strength of the beer-albumen with distilled water." As some plates which were prepared in the beginning of the summer, without the addition of either pyrogallic acid or silver, were very sensitive, I felt very much inclined to doubt that this was the most rapid form of the beer and albumen process. I resolved to try this form of it against plates prepared with the omission of both silver and pyrogallic acid, and also Captain Abney's form of it as given in the *Year Book* for this year.

With regard to Mr. Davies's addition of silver to the beer, I had serious doubts of there really being any free silver in the preservative at all as poured upon the plate. Mr. Davies recommends the addition of one grain of silver to one ounce of beer. Now, I should think that there was enough of chlorides and organic matter in an ounce of strong, sweet ale to reduce entirely the one grain of silver, and that, should by any chance free silver be left in the beer, it would be entirely reduced on the addition of the pyrogallic acid and albumen, which would form some complex organic salts of silver. In my own trials of it I used two grains of silver to one ounce of beer. After adding the pyrogallic acid and albumen some of the preservative was poured into a test tube, and a chloride added. I made several trials, but I really could not say that I detected free silver. I feel, however, that I should leave this an open question, as the colour of the beer or, rather, strong, sweet ale was rather high, which prevented the chloride of silver, if any were present, from being seen.

With regard to the addition of pyrogallic acid to the preservative, I have never before heard of it in connection with any dry process as a sensitive agent. Either it or gallic acid has been used in connection with the albumen process as a preservative—a final wash of any of them being said to confer great keeping qualities on the plates. My opinion of it, in connection with the beer and albumen process, is that it has no sensitising properties at all, that it only acts as a preservative, and that unless the plates are intended to be kept a very long time it had better be omitted from this process altogether.

With regard to the modification of the process as proposed by Captain Abney, I cannot say that I regard it as an improvement, but rather the reverse, as I can only look on it as a complication of what is in reality a very simple matter. As worked by Mr. Davies the preservative is applied at one application; but as proposed by Captain Abney you have two preservatives with a washing between. I, therefore, prefer Mr. Davies's plan as at once the simpler and better. There is little other difference, as both use the same materials, with the exception of the ammonia proposed by Captain Abney.

Let us now shortly inquire of what possible use ammonia can be as used with albumen and beer. Captain Abney says nothing in his article in the *Year-Book* of its use. But in a letter to the journals, the week after the publication of Mr. Davies's paper, he says:—"I lay great stress on rendering the film alkaline; it is an important means for securing rapidity." (See *Photo. News*, June 19). That Captain Abney is mistaken in this I will shortly show. In the meantime let us inquire about the use of the ammonia. Captain Abney says:—"To each white (of egg) one fluid drachm of ammonia must have been added." Now, if we add one drachm of ammonia to one ounce of albumen the result is merely a mechanical mixture of the two; there is no acid to neutralise in albumen, and there can be very little, if any at all, in the film after the silver is washed off. At any rate, if there be any left, it has no effect whatever on the sensitiveness of the film, as my comparative trials with other plates showed. I therefore regard the addition of ammonia to the albumen and beer as simply useless, and only tending to complicate the process. The application of the mixed albumen and beer may, therefore, here be dispensed with; also the separate washing, and the preservative applied as in Mr. Davies's method, which will at least save a great deal of time in the preparation of the plates.

I may just as well say here that, instead of Captain Abney's method being more rapid, as he seems to think, it is actually slower than either Mr. Davies's method with the silver in the beer or the other method without the silver and pyrogallic acid.

I will now shortly detail the experiments I made with the different plates. My first trials were between Mr. Davies's method with the silver and pyro. and the other method with only the plain beer and albumen. Plates were prepared the same in every way, the only difference being the preservative in the one having two grains of silver to the ounce and one grain of pyrogallic acid, while the other was only the plain beer and albumen. The plates were exposed at the same time on the same subject, and received precisely the same exposure, the light being very steady. I purposely under-exposed the plates to see what difference there would be in the development. On developing them the plate with the silver and pyro. began to show slight traces of an image first; but "the race is not always to the swift." After a while it began to lag, and the one with the plain beer had the advantage. In the end both plates came up well, though they were under-exposed and required a little forcing —the one without the silver being the better and more brilliant negative of the two, the other being flat and slightly fogged in comparison. The one without the silver was quite as well exposed as the other.

Another trial I made was with plates prepared with the same collodion and bath, the beer and albumen being also the same, but made up in the different proportions used by Mr. Davies and Captain Abney; also the method without the silver and pyro. The plates were exposed successively on the same subject without shifting the camera. They received exactly the same exposure, and this time a full exposure was given. To give the plates equal justice in the development they were all three placed together in a flat tray, and, the preservative having been washed off, a three-grain solution of plain pyrogallic acid was poured over them. In a short time a very faint trace of an image began to appear on the plate prepared by Mr. Davies's method, as well as on that with the plain beer, while the plate prepared by Captain Abney's method as yet showed nothing. I then added a few drops of ammonia, when the three plates began to come fully out—the plain beer plate, if anything, leading.

With all my experience in photography, both wet and dry, I could not prevent a smile rising to my face as I thus held the dish in my hand waiting to watch which was first being developed, and while I thought of the plates that were labelled on the back "Davies's," "Abney's," and "Plain Beer," I could not help exclaiming to myself—"May the best man win!" The plates being fully out they were intensified with a little acid pyro. and silver. The conclusion I came to with regard to rapidity was that the plate by Mr. Davies's method and the one with the plain beer were, as near as possible, equal—neither having the advantage. Both were fully exposed, while the one by Captain Abney's method would have required a little more exposure to have made it equal.

From Captain Abney's letter already alluded to he seems to be under the impression that plates by Mr. Davies's method cannot well be developed by the alkaline method. Such is not the case, as plates by Mr. Davies's method have been developed with the alkaline development ever since it has been introduced. I have myself developed plates by this process with as strong an alkaline developer as it is possible to use.

I will now sum up by stating what I think is the best form, and also the simplest, of the beer and albumen process. This is keeping out all silver, pyrogallic acid, and ammonia from the preservative, and using only the simple mixture of plain beer and albumen, unless when the plates are required for very long keeping; then one grain of pyrogallic acid to the ounce of beer should be added, which would give what I am almost tempted to call "indefinite" keeping qualities. If additional rapidity is to be got by this process I believe it would be in the direction of diluting the mixture of beer and albumen—to what extent I cannot at present say, but I should think to the extent of equal parts of water, or even double or treble the quantity. Any further experiments I make will be in this direction.

Having now spoken of the preparation of the plates I need say nothing of their development, but would simply recommend anyone trying the process to follow the directions of Mr. Davies and Captain Abney, both of those gentlemen having stated them so clearly and ably that I need not add one word.

In conclusion: I may just say that I can endorse all that both those gentlemen have claimed for the process, and that it is one of the best, if not the very best, and simplest dry processes which we at present have. If I have contributed anything to simplify it still further my object will have been accomplished.

J. M. Turnbull.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

III.—APPARATUS FOR DECANTING.

The operation of decanting or transvasing alluded to once or twice in the preceding chapter is of sufficient importance, from its frequent recurrence in both chemical and photographic operations, to have some space devoted specially to its consideration. In washing precipitates, removing clear solutions from deposits, delivering small quantities of test liquors, emptying various vessels, &c., &c., some acquaintance with the more useful methods is very desirable.

The simplest case that will occur will be the pouring from one vessel into another; yet this is not generally an easy operation, as, in laboratory work, it is not always possible in decanting a liquid to have it in the most suitable vessel for the purpose. In pouring from an evaporating dish with a lip the stream of fluid is very apt, if the dish be at all full, to separate into two parts, one of which runs back along the outside of the dish and gets wasted on the floor or table. This can be provided against by holding a glass rod perpendicularly in the receiving vessel and allowing the lip of the dish to touch it while the fluid is being poured. It will flow down the rod in an undivided stream, not a drop leaving the current to run along the back of the dish.

If the pouring vessel be very large and full, and have no lip or spout, difficulties are sure to arise. The glass rod will not be available here, and all that can be done is to grease a small part of the rim, when it will generally be found that the fluid will flow over the greased part in an even stream. It will, however, more frequently occur that the method of pouring is not available, owing to the bulk or lightness of the precipitate, when it is wished to decant as much as possible of the clear liquid without disturbing this sediment. In these cases a syphon is used.

This consists essentially of a bent glass tube open at each end. It is usually made of a V or U shape, and with one leg shorter than the other. When one leg is immersed in a fluid to such a depth that the end of the other outside one is below the level of the surface, and by suction or otherwise the fluid is made to ascend in the syphon and fill both legs, it will flow from the outside one and continue to flow, till the vessel is emptied, so long as the syphon continues to dip into the liquid and the end of its outside leg is kept lower than the level of the surface. If, as is generally done, one leg be made shorter than the other, all that is needed when once the action is started is to keep the short leg immersed in the liquid.

The principle of the instrument being understood, it will be seen that its form admits of many variations, and in practice it is found convenient to have several shapes which are useful for various purposes. The most elementary form—the plain bent tube of a V shape —will be found to answer most of the requirements of general use. There are two different methods of setting it in action. The short leg being immersed in the fluid the syphon is filled by sucking the air out with the mouth; the fluid will then flow until it is stopped by the removal of the syphon or the emptying of the vessel. The better plan is to fill the syphon first by pouring into it some of the fluid to be emptied, then, after placing a finger over each end, to upturn it and dip the shorter leg into the fluid, the finger being removed from it as it nears the surface. As some little dexterity is needed to perform the latter operation, owing to the readiness with which the short leg empties itself before it can be dipped into the bulk of the fluid, a method of making the syphon has been devised to render this action easier. The long end has blown into it, immediately below the angle, a bulb of capacity a little exceeding the whole contents of the short leg. In using this modified form it is only necessary to have the limb with the bulb filled upon immersing the syphon as before, no care being needed to keep the short leg full. Upon withdrawing the finger from the orifice of the long limb its contents begin to flow, the supply in the bulb keeping the tube below it full. The fluid is thus drawn up into the short leg, the air out of which is driven into the bulb, where it remains till the close of the operation, the flow through the syphon being now continuous and similar to the first form described. It will be found convenient to have a piece of india-rubber to protect the finger from the action of some fluids.

In cases where liquids of a caustic or corrosive nature have to be decanted the first-named method of starting the action will be ineligible owing to the danger of injuring the mouth; in fact, except for drawing off pure water, that plan is decidedly objectionable on all grounds. There are also disadvantages attending the use of the other forms which have caused the invention of a further modification in the form of the instrument. This consists of the insertion of a second tube into the long limb of the syphon a short distance from its orifice, bent up in the direction of the angle of the syphon, and continued for an inch or two above it. To use this instrument the short leg is immersed as before, the finger covering the end of the other. The mouth is then applied to the side tube just described, and the air sucked out until both limbs are full; the fluid then flows as usual when the finger is taken away. This side tube is often made shorter, and with one or two bulbs blown in it, to avoid the risk of any of the fluid being drawn into the mouth; but the most elegant addition is an india-rubber ball attached to its end for the purpose of exhausting the air, and so filling the syphon. An instrument so made is the form most to be desired. The chemist who wishes to construct as much of his own apparatus as possible will find this shape beyond his powers unless he be an expert glass blower; but a very ingenious substitute has been contrived which I will now describe. A long eau-de-Cologne bottle is required, which can be procured either from home or from some chemist's or perfumer's. The end of this is to be cut off at about half-an-inch from the bottom, and fitted tightly with a short cork or bung. In this two holes are to be pierced, into one of which the long limb of an ordinary plain syphon is inserted, and into the other a piece of tube a few inches long, and made with a slight bend, so that it will project from the syphon itself. The instrument is now complete, is used just in the same manner as the last, and answers all the purposes that it can be used for—the liquid, it need scarcely be explained, flowing through the neck of the eau-de-Cologne bottle.

When the fluid to be decanted is contained in a bottle or carboy the syphon may be very conveniently inserted through a well-tapered cork or bung, through which also runs a piece of glass tube bent at a slight angle above the top of the cork. When the cork, with syphon, &c., attached, is placed in the mouth of a bottle moderately tight, the syphon can at once be started by blowing down the small tube, and the action can be stopped either by removing the syphon or placing the finger against the end of the small tube, when no air can enter, and the flow of liquid will cease. I have no hesitation in saying that this arrangement of syphon will be found one of the handiest pieces of apparatus a photographer can possess. It is invaluable for drawing off collodion, and, if the hole in the cork be made just tight enough to allow of the syphon being moved higher or lower without much trouble, and a well-tapered cork be selected, the same arrangement will answer for a variety of bottles.

For drawing off small quantities of fluid from small bottles I have a somewhat similar arrangement made, wherein the syphon is replaced by a bent tube with a very short limb, which lies outside, instead of inside, the liquid. In using this it is necessary to blow through the small tube *all the time* the fluid is passing through the exit tube. It will be found useful, among other purposes, for drawing off small quantities of experimental collodion.

In all cases when using the syphon to decant the supernatant liquid from precipitates care must be taken that the end of the limb which is within the fluid is not placed too near the precipitate, for there is always a current produced which would carry into the syphon a portion of the deposit, and so render turbid the whole of the liquid which had passed through. For decanting from deposits that are very easily disturbed the ill effects of such a current will be prevented by having a syphon with the short leg bent up for a very short distance into a U shape.

The pipette is a very useful instrument for withdrawing small portions of solution from above a precipitate, or from places which could not be reached conveniently by other means—as, for instance, from the bottom of tubes, &c. It is made in an endless variety of shapes, either graduated or plain. In its simplest form it is a glass tube drawn to a fine, but not a capillary, point at one end, and is used by immersing the point in the fluid to any required depth and then placing the moistened finger over the open end. Upon withdrawing the pipette out of the fluid it retains all that had entered it before closing the upper end with the finger—this quantity varying; of course, according to the depth to which the pipette had been immersed. If the fluid be shallow, and some considerable quantity is required, it will be necessary to fill the pipette by sucking the air out with the mouth, when as much of the liquid as is required may be taken up. A pipette with a bulb blown into it will be useful for this purpose; or, after the manner of the syphon described, the top of the pipette may be provided with an india-rubber ball to exhaust the air and draw up the liquid. A tube funnel with a piece of sheet india-rubber tied across its mouth forms a very efficient pipette for use without the mouth.

The graduated pipette is a very important instrument in testing liquids holding, as a well-known writer has observed, "the same importance in volumetrical analysis that the balance does in gravimetrical analysis." For most purposes it will be found convenient to select one of the *tube* form which can reach the bottom of the bottles holding test liquors; but it will be well to be provided with a second to hold larger quantities, as a tube pipette would have to be inconveniently long if required to hold any considerable quantity.

The graduated pipettes are of two kinds—those to deliver a given quantity, and those to deliver any quantity at will. As these instruments will be only used for exact operations a few remarks about their use will be serviceable. When delivering their contents it will be found that a small quantity is retained by the point. In the first class of graduated pipettes the graduation allows for that, and it is not to be delivered; but in the second class, graduated for *any* quantity, it will be necessary to test the instrument to see if it be graduated to allow for the retained drop or not. If the residuum have to be reckoned as part of the measured quantity the bulk of the contents should first be discharged by removing the finger from the mouth of the pipette, and then, the point being directed so as just to touch the sides of the receiving-vessel, expelling the last drop by blowing. The pipette will be found to be a very useful adjunct to the tube argentometer.

G. Watmough Webster, F.C.S.

SPIRIT OF THE JOURNALS.

[A communication to the Edinburgh Photographic Society.]

This title seems an odd one, seeing that it is four months since the first of this projected series of papers was brought before the Society, and that business avocations have prevented me from being present at a single outdoor meeting held since then.

By-the-bye, I had forgotten that memorable one where our worthy Secretary's "traps" were subjected to the intelligent scrutiny of Lady Ruthven's milch cows, who, while the photographers were having luncheon with her ladyship, proceeded to swallow the rather indigestible matter of which cameras and tripod stands, double dark slides, focussing cloths, and other impedimenta belonging to the outdoor section of the Edinburgh Photographic Society was composed.

In like manner I have set myself to swallow and, if possible, digest the rather indigestible contents of the journals. Accordingly, having made the preliminary number of wry faces, I begin, but always premising that the last four months' journals are to me a sealed book, and that I intend to look back for a month only, and that the notes will be at least as fresh, if not fresher, to me than they are to you.

First in order we may note the proposed exhibition of the Bengal Photographic Society, which seems one of those showing a large amount of healthy vitality. I might suggest an amendment of the seventh rule:—"Exhibitors must make their own arrangements for the removal of their photographs the day after the closing of the exhibition." Now, I apprehend that few British photographers have East Indian agents, and the removal or packing and returning of the pictures should have been undertaken (for a fee, of course,) by the Society for all foreign exhibitors.

The letters from correspondents often contain about the most interesting matter in the journals, and much good frequently results from them. In the *News* of September 11 Mr. Houlsom asks how to mount photographs on thin boards so that they may not cockle after mounting, and as I do not see that he has been answered I will try to help him and others who may be in the same predicament. The way to do it is this:—Take a sheet of stout printing or cartridge paper, damp it thoroughly all over, then take as many photographs (untrimmed) as will cover it; damp them also. Paste these down with starch paste on the cartridge paper while both are quite damp, pressing out all air-bubbles and removing any little knots of starch, &c.; then glue all the edges of the sheet of cartridge paper, keeping clear of the photographs. Attach this to a drawing or straining board, and, stretching the paper with the prints as neat, tight, and flat as possible, put it aside to dry. When dry cut the paper off the board and trim the prints; they will then be quite flat and need no pressing. Next attach them to the thin boards, stout paper, or scrapbook by glueing about one-eighth of an inch all round, and attach the two together. This will give a beautifully-flat mounting with no cockling. On no account are prints after being treated as described to be pasted all over the back, as that would simply undo what has been done. I trust this will prove a bit of wholesome advice to more than Mr. Houlsom.

The oasis in the desert is not more pleasant to the weary traveller than the letter from my friend Mr. Joseph Collier from the slopes of the Sierra Nevada was to me—part of which appeared in The British Journal of Photography during last month—coming as it did in the midst of a weary wading through the journals in search of something to fill this paper. With what zest and gusto the quiet Scotchman describes his romantic expedition, and improvises the necessary means to surmount difficulties! Every photographer should study this delightful letter. Whatever may be the pecuniary results of the adventure, it will, at least, make Mr. Collier's burden no heavier to know that I and the rest of his Edinburgh friends wish him "God speed" and the best of luck in the new home he has chosen.

The chapters on the saving of wastes in The British Journal of Photography should be carefully studied by professional photographers, containing as they do the long-acquired experience of Mr. Foxlee, than whom there are few more competent to teach. On one point only do I join issue with him, namely, as to the saving and throwing down of hyposulphite wastes. The plan I have had in operation for years is, I think, better than that proposed by him, and is very simple in working. It is as follows:—The developing-sink which is a large wooden one, has three exits—one for waste water communicating with the drain, one for hypo. communicating with a wooden tank, lined like a cistern with pretty thick zinc, such as is used for baths, which is placed outside the developing-room. This has a tap placed at about two-thirds its height for the purpose of running off the exhausted liquor; into this all the hypo. which has been used for fixing prints or negatives is run. The zinc acts in the usual way, throwing down the silver automatically, all that is necessary being to stir occasionally, and to scrub the sides of the tank so as to keep the exposed surface of the zinc in good working condition. The liquor is tested to ascertain whether all the silver has been thrown down, and is then run off to the level of the tap, and so on. The third exit leads to another wooden tank provided for the reception of wastes from developing plates, washing prints, dishes, &c., which are all run into the same receptacle under the developing sink. A couple of common vulcanised balls are used as stoppers for the exit pipes not in use. A supply of salt is added from time to time, and the surplus water run off as it accumulates. When a sufficient quantity of the chloride and other wastes has been thrown down it is collected and fused along with the deposit recovered from the hypo. tank. I find this to be a very effectual and easy plan for recovering the wastes, involving no trouble, and never getting out of order. The present arrangement has worked for ten years without repair, which, I think, is proof positive of its lasting qualities, as well as of its efficiency.

Among the *Foreign Notes and News* in The British Journal of Photography for Sept. 18 is one from Dr. Vogel on intensifying with permanganate of potash, with which he seems to be charmed. Being, as I presume, his first experience with it, I have no doubt he believed he had discovered a good thing; but appearances are deceptive. The learned doctor will find, as I have, and as Mr. Jabez Hughes did, and published his experiences thereon years ago, that it is one of the least permanent of all the methods of intensifying. If the learned doctor can discover an intensifying agent as easily applied, as effective for the time being, and permanent, he will confer no small boon on photographers—but this is not one.

Very pleasant is the irony of "Scotticus" in The British Journal of Photography, who dates from the unpronouncable "Pass of Queghanhulich," and we wait with impatience for a treatise on the qualities, styles, and prices of the garments which "clothe the spirits." I trust he will add a word or two on their wearing qualities, and ascertain, if he can, whether we are to meet our lost ones in the spirit land as the wrinkled and toothless grannies and grandfathers who sometimes die here, or, rather, as we love to think of them, in the heyday of their youth and strength and beauty. Do, good "Scotticus," be speedy with your report, for we are all waiting for the next advent of so excellent a reporter!

I may here conclude this month's hasty notes by signifying that I have tried to avoid subjects likely to be taken up by the monthly summary of the *News*, the gossipy monthly *Notes* of the "Peripatetic Photographer," as well as the occasional *Notes from the North* of our esteemed joint Secretary, Dr. Nicol, rather choosing those points which might be overlooked, or such as are of practical utility, or in which a bit of practical advice may be of use; and I trust that whoever takes it up next may adopt their own and not my way, and thus we shall have original or, at least, varied ways of seeing things brought before us every month. W. H. Davies.

PRACTICAL NOTES ON THE SAVING AND REDUCING OF RESIDUES.

CHAP. VII.—THE PREPARATION OF NITRATE OF SILVER DIRECT FROM RESIDUES.

The present and final chapter will be descriptive of a method by which the silver may be recovered in the form of pure nitrate, without the necessity of employing anything beyond what is in constant use in the dark room. This method may be called the "wet process;" and, although it is not a profitable one when *large* quantities have to be recovered, it will be found specially useful to amateurs and others having comparatively small quantities to deal with, and which would not repay for providing a furnace for its reduction, or even for sending a long distance to the professional refiner. I have myself frequently recovered from twenty to thirty ounces of nitrate in this way, and, in my estimation, this quantity is about the maximum that should be treated by this method.

With regard to the means of "saving" and "collecting" the wastes, what has been said in Chaps. I. and II. will apply in this case, except that the amateur may not have separate rooms specially devoted to the various processes of printing, &c., but conducts all his operations in his dark room, which, if not provided with a properly-fitted sink for developing, should be furnished with a good-sized vessel for the purpose. I would here again recommend the use of a household washing tray, and into this vessel should be put the washings of prints, together with all solutions containing silver (except, of course, the cyanide and hypo. solutions); a small lump of salt must be added from time to time. The acid from the developing solution will assist the subsidence of the chloride; and when this has taken place the liquor should be syphoned off. It will be found convenient to empty out the precipitate from time to time, as it accumulates, into an earthenware crock for further subsidence. The hyposulphite solutions should also be saved and treated in the same manner as described in these chapters, except that the sulphide will not require drying. Should any old nitrate baths have to be dealt with they should be filtered previous to their being precipitated, as the chloride will then be in a sufficiently pure state to be dealt with in the second operation, and, therefore, should not be added to that from the washing waters.

I will assume that Chaps. I. and II. have been carefully read: and, premising that what was said in them will be adapted to the requirements of those working on a smaller scale, I now proceed with directions for the conversion of the residues into the nitrate.

To do this the contents of the developing tray, together with any chloride that may not be sufficiently pure to be treated at the second stage, should be put, after receiving one or two washings and without drying, into a large, deep dish—a common, brown, baking dish without the central partition will be very useful for the purpose—and to this are added the ashes of the paper after they have been well sifted to free them from extraneous matter, which, if present, would prove a great annoyance. The whole should now be well mixed, and, if required, water should be added so as to make the mass into the consistence of thin cream. Sulphuric acid must now be added, in the proportion of about an ounce to each pint of water in the dish. Some cuttings of zinc should then be dropped in, and the whole allowed to stand undisturbed for thirty-six hours, by which time the chloride ought to be converted into metallic silver. The remains of the zinc should now be removed. If, however, all have been dissolved, some more must be added so as to make sure of the complete reduction of the chloride, which may be assumed to have been effected when some zinc remains undissolved at the end of the time. The residue should be washed in several changes of water, the last two of which ought to be distilled or rain water, and transferred to a large glass flask, and then drained as closely as possible. A little nitric acid must now be added, in the proportion of about one part of acid to each two parts of water remaining in the flask; the acid should be added by degrees, as it attacks the finest particles of silver violently and with effervescence. When the whole of the acid has been added the flask should be gently heated over a spirit-lamp, and finally boiled for some time; this should be done in a well-ventilated place or on the hob, so that the fumes may escape and not be inhaled by the operator. After the solution has become saturated with the silver it should be filtered into a large bottle, fresh acid diluted with two parts of distilled water added to that which remains, and the boiling repeated so long as any silver can be dissolved out, after which the residue should be rinsed with several changes of distilled water, which should be also filtered into the bottle.

The residue may now be tested, to see if it still contain any silver, by drying a small quantity, mixing it with carbonate of soda and potash, and submitting it to the action of the blowpipe on a piece of charcoal, as directed at page 460. If any be present the residue should be again treated with zinc and sulphuric acid, and then with nitric. This will rarely be required, as the whole of the chloride should be converted in the first instance. The sulphide from the hypo. solution, after several washings or until the water ceases to be rendered turbid by the addition of a drop of nitrate of silver, must be put into a flask and nitric acid added, and the whole boiled, as just directed for the other residue, to extract the whole of the silver, this solution and the water used for washing that which remains undissolved also being filtered into the bottle, the contents of which is now a strong acid solution of nitrate of silver, which, if evaporated, would give crystals too impure for use; hence it requires further treatment to render it fit for photographic purposes. It must again be thrown down as a chloride with a filtered solution of common salt. The chloride precipitated from the old nitrate baths should now be added, and the whole well washed in many changes of water, using distilled water for the last two. We have now got a pure chloride of silver.

It may be asked why the chloride obtained from the washings of prints should not be kept separate and added at this stage. My answer is that it may if it be sufficiently clean, which is rarely the case when it has been a long time collecting in open vessels, as it is almost certain to be contaminated with dust and other impurities.

Having got a pure chloride we must convert it into the metallic form by decomposing it with zinc and sulphuric acid, as directed for the residues from the developing tray, using *pure* zinc and sulphuric acid for the purpose. When it has stood long enough for the decomposition to be complete the zinc should be removed, and the silver, after receiving two or three washings and being drained, should have upwards of an ounce of sulphuric acid added to it to dissolve any particles of zinc that may have become detached. It must now be thoroughly washed until the water (which, for the final washings, should be distilled) ceases to redden litmus paper. It is then put into a clean flask, and dissolved in pure nitric acid diluted with two parts of water, using heat to assist the solution. No more acid should be used than is sufficient to dissolve the metal, as it will have to be evaporated in crystallising the salt. After the solution is complete it should be filtered into a Berlin evaporating dish and crystallised on a sand bath, using a slow heat for the purpose. The crystals obtained will, no doubt, be acid, and should be again dissolved in distilled water and recrystallised to obtain them neutral. This nitrate of silver will be found superior to the common commercial samples, being made with pure silver.

If the operator should object to the trouble of crystallising the nitrate it may be kept in solution, but the free acid will require neutralising, which may be done with oxide or carbonate of silver. The simplest plan is to pour a small quantity of the solution into a good-sized bottle, adding a solution of bicarbonate of soda until the whole of the silver is precipitated; and, after washing it in distilled water to free it from the nitrate of soda in solution, to add this carbonate to the acid solution, which will dissolve it with effervescence, thus neutralising the acid. Should the whole of the carbonate be dissolved some more must be precipitated and added; should, however, a large quantity remain undissolved a few drops of nitric acid may be added, which will again convert it into nitrate. Care should be taken not to dissolve the whole of it, as the presence of a small quantity will ensure the neutrality of the solution.

Its strength may be ascertained by the hydrometer or argentometer. If it is to be used for the negative bath it will be advisable to expose the bottle containing it to strong sunlight for a short time. When thus treated the bath made with it will be found nearly or quite as good as those made with the crystallised salt.

Although this process may, on reading, seem tedious and troublesome, yet in practice it will be found very simple.

In concluding these notes I may say that whilst having gone fully into what I consider the best and most profitable means of recovering the metals, I have throughout borne the fact in mind that time is money, and that a great expenditure of time to recover a few grains of silver will not be remunerative; therefore I never consider very dilute solutions containing only a grain or so to the gallon (such as the final washing water prior to toning the prints) worth saving. I may, however, add that the less silver that is wasted the less will there be to recover, and the more profitable will this prove to the photographer; for it must be borne in mind that, however much may be recovered, it is only a *part* of what has been wasted. Therefore I cannot too strongly urge the exercise of as much care as possible in avoiding all *unnecessary* waste.

Many amateurs, as well as photographers who conduct only small businesses, very frequently sacrifice their wastes on account of the imaginary difficulty and cost of utilising them, together with the small value of the product when converted. I would again beg to remind those that only about five, or *at most* ten, per cent. of the silver they purchase remains in the finished photograph, and that with very little trouble and small cost sixty or seventy per cent. may be recovered. Saving the waste will cost nothing; the collection and conversion entail but little trouble and cost. This need only be done once a year, and then during the dull winter months; and it will prove to those of an experimental turn of mind a pleasing as well as a profitable chemical experiment. I will conclude by paraphrasing an old maxim, and say—Take care of the residues, and the returns will take care of themselves. E. W. Foxlee.

FOREIGN NOTES AND NEWS.

The Bulletin of the Association Belge de Photographie and its Heliotype Illustrations.—M. Roselle's Dry Process.

All that relates to the establishment of a new national photographic society on a comprehensive scale is interesting just now to those English readers who would be glad to see such a society established in their own country, with a high aim, a judicious code of rules, and under proper management. It is, therefore, with no common interest that we watch the proceedings of the newly-formed *Association Belge de Photographie*, founded, as it appears to be, on principles which are sound and right, and embracing, as it is intended to do, branch societies in all the principal towns in the kingdom. It remains for us here to redeem the promise given last week and say a word or two respecting the first two numbers of the *Bulletin* of the Association, which we have received.

The *Bulletin* is a handsomely-printed *brochure*, published monthly, containing a photographic illustration, and recording the proceedings at the meetings of the various sections of the Association, the original papers read, &c., as well as a general *résumé* of the contents of foreign photographic journals and news.

The illustration in the first number is a "heliotype" print—that is to say, a collotype print similar to those issued by the Heliotype Company of London—from the *Etablissement Polygraphique*, Rue des Minimes, Brussels. The proof is a view of a landscape; it is upon plain paper, and shows the gradations of distance tolerably well. The colour is good, the blacks vigorous, and the general effect artistic. The sky has a slight tone when contrasted with the white margin of the paper. The proof has been pulled upon plate paper, and is not mounted. The plate paper is thick, and does not appear to have been enamelled upon the surface. The negative was one by MM. Géruzet *frères*, taken by wet collodion, with a globe lens having a diaphragm of one-eighth of an inch; time, seven in the evening; exposure, one minute. The printing process appears to be the same as that of Mr. Ernest Edwards, employed by the Heliotype Company of London (now in the hands of Messrs. Gilbert and Rivington, St. John's-square, Clerkenwell).

The illustration in the second number is also a heliotype; but it is glazed, and mounted upon tinted paper. It is from the establishment of M. Charles D'Hoy, Rue du Pont-Madou, Ghent, the subject being the cellar of the ancient abbey of St. Bavon—a ruinous assemblage of old walls, columns, and arches in full daylight.

The printing process resembles that of Albert, of Munich, a double film of gelatine upon a thick glass plate having been employed. Five hundred copies were pulled from this plate for the *Bulletin*, and it would have yielded at least 1,500. The editor congratulates his readers upon this fine specimen, and gives it as his opinion that the process is calculated to replace silver printing with advantage, the result being equally good, and the general effect similar.

The following is an outline of the dry process of M. Roselle:—The preliminary coating consists of albumen one part, water three parts. The ordinary dry-plate collodion and nitrate bath are employed, with the usual amount of washing. The following preservative is used, viz., honey, diluted with an equal bulk of water, and filtered through paper, which is a long process. It is poured over the plate, allowed to soak into the film for a few seconds, and then washed off, after which the plate is set up to dry. The honey may be replaced by an infusion of dried figs or raisins. The fruit is cut into small pieces, which are then put into boiling water. The proportions are one of fruit to ten of water. The mixture is left until quite cold, and is then filtered.

The development may be effected either with pyrogallic acid or protosulphate of iron. The following are the formulæ recommended. For the pyrogallic acid developer—

Pyrogallic acid	1 gramme.
Citric acid	1 „
Water	800 c.c.

For the iron developer—

Sulphate of iron	40 grammes.
Tartaric acid	12 „
Water	800 „

The plate is wet with water, and the developer poured over it. This produces no other effect than to saturate the film with the liquid. The developer is then poured off into a measure, and a few drops of a four-per-cent. silver nitrate solution are added to it. This is then poured over the plate, and the development proceeds in the well-known manner. The iron developer requires a shorter exposure, but is more liable to produce stains and a deposit of metallic silver upon the film. The plates are much more sensitive when they are not washed before applying the preservative; in that case they will not keep, but must be used the same day.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The twelfth ordinary meeting of this Society was held at 5, St. Andrew-square, on the evening of Wednesday, the 7th instant,—Mr. R. G. Muir, President, in the chair.

The minutes of the previous and outdoor meetings were read and approved of, and Messrs. Alexander Asher, John Thompson, and Alexander Henderson (of Montreal), were admitted ordinary members.

Mr. J. M. Turnbull read a paper entitled *A Few Words on the Beer and Albumen Process*. [See page 495.]

Mr. Matheson had worked the process almost exclusively, and succeeded better with it than with any other. He had tried the addition of silver as now recommended by Mr. Davies, but he really could not find any difference between plates prepared with it and those prepared in the older way. He called the attention of the meeting to what he considered a curious fact, viz., that at the time the process was introduced by Mr. Davies he produced pictures with exposures of two and three minutes, but gradually the necessary exposure had been increased until at the present at least three times as long was required. He wondered whether the beer made now differed from that of six or eight years ago.

Mr. Yerbury had not much experience in dry-plate work, but what he had done was with Mr. Davies's process. He had tried, both with and without the addition of silver, and was quite certain that the former was the best. The plates were not only more rapid, but the resulting negatives were of better quality.

Dr. Thompson had not done much in dry plates this season, but what he had, had been by Mr. Davies's method, and he found it in every way satisfactory. He worked exactly according to the directions given by Mr. Davies, except that he had somewhat raised the temperature of the plate during development. His plan was to dip the plate in a tray of equal parts of alcohol and water, and, after washing, to place it in a dish of water heated to about 45° C. It was then transferred to a solution of plain pyrogallic acid, and the development proceeded as rapidly as in ordinary iron development.

Dr. J. Nicol thought Mr. Turnbull was mistaken in supposing that the addition of ammonia to albumen resulted in a mere mechanical mixture. There was in reality a very complicated reaction which, amongst other results, gave a limpidity to the albumen by the breaking up of the cellules of which it was partly composed. He had experimented more or less with nearly every dry process introduced, and had produced fairly good negatives with them all, but when he wanted pictures, rather than experiments, he had for years trusted to Mr. Davies's process in preference to all others. He could easily understand how Mr. Turnbull might make a series of comparative experiments, and come to the conclusion that the addition of silver gave no additional sensitiveness. It should, however, be remembered that very much, in all processes, lay in the development, and it was not at all unlikely that two modifications developed in the same way would give only similar results, while by some alteration in the method of bringing out the image one might be found very much more rapid than the other. In the case in point, he knew that the plates prepared with silver in the beer could, by very slight modification in the method of developing, bear a reduction of nearly one-half in the time of exposure. He quite agreed with Mr. Matheson in thinking that the plates required a much longer exposure now than they did ten years ago, but he did not think it was caused by any alteration in the quality of the material used. He was rather inclined to attribute it to a generally higher cultivation of the knowledge of what really constituted a good negative, as he believed that many of the hard, patchy negatives—the result of the short exposures of that period—would not now be thought worth varnishing.

Mr. W. H. Davies remarked that he had never said that the beer and albumen was a rapid process, and if it had been he would have had nothing to do with it. He did not like rapid dry processes, as wherever they had great sensitiveness they had, as a natural result, great uncertainty. He had no doubt that Mr. Turnbull's experiments were correct so far as he had gone; but he believed that nearly everything in connection with rapidity depended on the development, or on the addition to the film of something by which it would be promoted, and he thought that the silver which he added to the beer acted in that way. He had brought one or two negatives, however, to show what could be done in the direction of rapidity with beer and albumen if rapidity were really wanted. [Mr. Davies then handed round three pairs of negatives, one of each being by beer and albumen and one by wet collodion. Each pair had been exposed simultaneously, the preservative of the first and second being made decidedly alkaline, and the third, after preparation, thoroughly fumed with ammonia. The first two had been exposed ten seconds and were both under-exposed, but the dry plate contained considerably more detail than the wet. The second pair had received an exposure of eighteen seconds; both were fully out, but the dry plate was decidedly the better of the two. The third pair, the dry one of which had been *fumed*, were exposed for only one and a-half second. The wet plate was considerably under-exposed, but the dry one showed full detail and quite sufficient printing density, the clouds especially being very fine.] In reply to several questions he (Mr. Davies) said he had not been able to make many experiments as yet with the fumed plates. He found, however, that after fuming the plates required to stand for at least four hours before exposure. He promised to continue his experiments and report the result to a future meeting.

Mr. Davies then read a communication, *The Spirit of the Journals* [see page 497], which created some amusement, and for which he received a vote of thanks.

A donation of a number of very fine prints from Mr. Henderson, of Montreal, to the album of the Society was announced, and Mr. Yerbury also contributed some fine specimens of his work at one of the outdoor meetings, one of them including a capital group of the members present.

On the motion of Mr. W. Neilson votes of thanks were awarded to Mr. Turnbull for his paper, and to Messrs. Henderson and Yerbury for their donations, and the meeting shortly afterwards adjourned till the first Wednesday in November, when the annual general meeting will take place.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The monthly meeting of the Board of Management of the above Association was held at the offices, 174, Fleet-street, on Wednesday evening, the 7th instant,—Mr. W. S. Bird in the chair.

After the routine business had been disposed of,

Mr. H. Baden Pritchard, the Treasurer, announced the receipt of a donation of five guineas from Mr. Bedford, who had also signified his intention of giving an annual subscription of one guinea.

The Secretary announced the receipt of twelve 12 × 10 photographs from Mr. Warwick Brookes, of Manchester, twenty-five large pictures and thirty-six *cartes* from Mr. Rejlander, and thirty-six assorted from Mr. Stillman, as prizes in the art-union distribution, which a sub-committee of five were appointed to organise and carry out.

The Secretary was, on the motion of Mr. Attwood, instructed to write to the Council of the Photographic Society of Great Britain to ask if they would kindly grant them one day during their exhibition for the benefit of the Association.

The Chairman having vacated the chair, he was unanimously elected Chairman of the Board of Management in the room of Mr. Croughton, who had left London for Lowestoft. On Mr. Bird resuming the chair,

The Secretary presented an application from a photographer for relief. The applicant stated that he had been in business for himself nine and a-half years, and had done very well till eighteen months ago, when he was taken ill, since which time he had not been able to do much work. He had a wife and eight children (the eldest thirteen) dependent upon him. His apparatus was pawned, and his landlord had distrained for rent.

Although the applicant was not a member of the Association the Board were of opinion that it was a case worthy of consideration; and, after hearing particulars from the two members who had signed the application, the sum of five pounds was voted for his relief.

Fourteen new members were proposed for election, and, on the Secretary reporting that all references were satisfactory, they were duly admitted.

The Secretary (who had been acting as Treasurer *pro tem.*), on handing over the the accounts to Mr. Pritchard, the Treasurer, submitted a balance sheet of affairs, which, it may be mentioned, showed that the receipts (donations and subscriptions) amounted to £45 14s. 2d., the expenses (from the commencement) being £21 18s. 8d., leaving a balance in the London and County Bank of £22 19s. 6d., and 16s. in the hands of the Secretary.

The meeting then adjourned till the 4th November.

Correspondence.

THE CRAWSHAY AWARDS.

To the Editors.

Gentlemen,—Is there not some error in the award of the Crawshay prize for the best enlargement?

In the published circular containing the final announcement of the conditions to be observed by intending competitors it is expressly stated that "worked-up prints will be disqualified," slight touching or spotting only being allowed.

This having been from the first so clearly and distinctly insisted on, it is a matter of the greatest surprise to a large number of photographers, including myself, to find the prize awarded for enlargements *professedly worked-up*, such enlargements being exhibited as an illustration of a patented method of finishing or working-up ordinary prints, the enlarged photographs themselves not being the work of the exhibitor, who only claims the method of *finishing*.

I have nothing to say in dispraise of Mr. Ferranti's process of finishing photographs, my sole object being to call attention to the fact that the judges have completely ignored the conditions laid down by Mr. Crawshay, and accepted, as binding, by those competing for the prize.

Under these circumstances I enter my protest against the award to Mr. Ferranti, the pictures shown by him being clearly disqualified according to the plainly-expressed terms of the invitation to competitors.—I am, yours, &c., B. J. EDWARDS.

6, *The Grove, Hackney, London, N.*, *October* 14, 1874.

TECHNICAL EXHIBITION MEETING OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Will you kindly again permit me to announce that the Technical Exhibition Meeting of the South London Photographic Society will take place at the Cambridge Hall, Newman-street, Oxford-street, on Thursday evening, October 29, at seven o'clock.

This meeting is intended for the exhibition of apparatus and appliances, the reading of *short* and pithy papers illustrated with specimens, and demonstration of experiments and processes, together with the exhibition of results of secret and patented processes.

The following rules have been drawn up by the Committee for the regulation of the business:—

"All papers to be read must be received by the Secretary, at his residence, on or before the morning of the 28th October.

"Exhibitors wishing to work processes or experiments must acquaint the Secretary with the probable length of time required.

"Questions may be asked, and information given, in relation to the matter before the meeting, but no discussion will be permitted.

"Every article must have attached to it an explanatory label or short description of its use.

"All articles must be sent (carriage paid), with instructions for return, to the place of meeting not later than three o'clock on the 28th October."

Any further explanation may be had by applying to the Secretary.—I am, yours, &c., EDWIN COCKING, *Hon. Sec.*

57, *Queen's Road, Peckham, S.E.*, *October* 12, 1874.

METHYLATED SPIRIT OF NITRE.

To the EDITORS.

GENTLEMEN,—In reply to the request in your "Answers to Correspondents," I beg to say that by *methylated* spirit of nitric ether I intended to be understood the *spiritus ætheris nitrici* (sweet spirit of nitre) of the pharmacopœia, made from methylated instead of pure spirit. The methylated article was recommended in preference to the pure simply on economical grounds.—I am, yours, &c., T. N.

October 12, 1874.

KENNETT'S GELATINO-PELLICLE.

To the EDITORS.

GENTLEMEN,—Anything coming from Mr. P. Le Neve Foster's pen is generally so well deserving of our attention that one feels very reluctant to find fault with him, and I should not have done so on this occasion did I not recollect that at page 87 of your ALMANAC for this year, he reminds contributors to the journals of "the very imperfect manner in which descriptions are given of any new piece of apparatus or novel process."

Now, in your number of the 2nd inst., Mr. Foster gives us his experience of the above process, and, speaking of its extreme rapidity, says that, with a Ross's rapid symmetrical lens and No. 3 stop, an exposure of from three to five seconds to a fairly-lighted landscape was sufficient. But I should like to know the aperture of the said lens, its equivalent focus, and size of stop; also, whether by "fairly-lighted" is meant sunlight or bright diffused light. Without these data the information given is all but valueless. If the lens in question were one of, say, two inches diameter and fifteen inches focus, then the above exposure was, no doubt, very quick; but if it were only one inch in diameter and six inches focus I see nothing remarkable in it, for we have already two or three dry collodion processes which give equally rapid results, and without the disadvantage attending the use of gelatine.

Apologising for trespassing upon your space,—I am, yours, &c.,

Oxford, October 10, 1874. JOHN VAUGHAN.

P.S.—Since writing the above I have seen Mr. Cocking's letter announcing the intention of again holding a technical exhibition in connection with the South London Photographic Society. It is to be hoped that those present will not turn the place into a "bear garden," as was the case last year, and also that they will not omit the civility of passing a vote of thanks to the Chairman. It was no pleasant position he occupied, and in his endeavours to "throw oil upon the troubled waters" he did not receive that respect to which he was entitled; in fact, a friend of mine—not a member of the Society—was so thoroughly ashamed of the whole affair that he felt it to be his duty to write a private letter to the Chairman thanking him for presiding, and expressing his regret at the unseemly behaviour of the meeting.—J. V.

"HOW TO SEE STEREOSCOPIC PICTURES WITHOUT A STEREOSCOPE."

To the EDITORS.

GENTLEMEN,—I cannot forbear writing to thank you for the increased power (for knowledge is power) afforded by your article having the above title in last week's issue.

With one day's intermittent practice, strictly following your very clear instructions, I can now see a stereograph with the naked eyes with as much pleasure as if looked at through the instrument.

I really think the information there given is as valuable as any that has appeared in print for some time, and I am sure only adds to the heavy debt of gratitude the brotherhood already owe you.

Again expressing my delight and pleasure in the new acquisition,—I am, yours, &c., A. W. BEER.

Leeds, October 7, 1874.

SPIRIT PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I have been waiting for an account from our "sober" friend, "Scotticus," as to what success he had amongst the spirits, but as no intimation came from him last week I fear something may have happened to him. Ghosts may be a "tradition" in the north, but not so "spirits," and, most positively, if second sight be not common to those controlled by highland spirits, "double sight" is; and the various trance conditions produced by the spirits of the north is such that cells* or wards have been provided for all degrees, from the faint or semi-trance to the dead or insensible trance.

As our friend is in a "wild" country he may have been controlled in some mountain pass by the spirits, and who knows when you may hear from him, unless the spirits for his sake endow the "blind shelty" with sight! In that case the shelty might find the way home with him. Or it is, perhaps, more than possible he may have found his way to the photographers, and that his success has been so great he could not return in time to report to you last week.

If it be true that the indication of the medium under control is a sign of the quality and appearance of the spirit controlling, I should predicate that "Scotticus" will not be happy enough to get "half-a-minute with Adam." I never heard that Adam was a Scotchman. The spirits who come to a wit like "Scotticus" must be north-born. He might get Burns in the act of singing "Scots wha ha'e," or a devout minister half entranced by the spirit; or, it may be, a whole set of those immortals who played their part at the "holy fair." These would be more valuable to "Scotticus" than even Adam himself—at least in Scotland.

"Scotticus," in alluding to the dress of spirits, actually says—"If they have decency to wear any." If they are the spirits of Scotchmen, and if they are any other, they had better remain "awa." They will be decent if report speaks well of them; and we must not forget that for identification spirits often appear as they were when on earth. If that be the case with "Scotticus," what a set of figures may he not bring back with him!

What comic and interesting forms highland men have when under the control of the maudling, imbecile spirits common north of the Tweed! Fancy "Scotticus" getting a spirit photograph of a spirit like himself in the act of penning his very witty letter; or, perhaps, of a genuine "Sandy" in a high spiritual state, crying over a spiritual fiddler playing "Wearing awa;" or, more interesting still, a group of northmen having a spiritual *seance* at the conclusion of a pleasant day spent in the kirk.

Well, as to Mr. Hall's statement in all its "transparent simplicity." Suppose it had been made in a "witness-box," what "ticklish questions" would a "counsel" or "Scotticus" have asked? Likely the following:—Whether the picture of his father like the photograph was in existence; if so, was it possible Bequet could by any means know it? Was the method of making the picture open? If these and other questions were answered satisfactorily, what then?

A word to "Scotticus." If he will test Mr. Hall he will find him not the fool he, in the exuberance of his weak wit, would make him out to be. Allow me to recount an anecdote here:—About six weeks ago I called on an eminent photographer. He said to me—"Come in; my brother is here and wants to see you." "Indeed," I replied. "Yes," said he; "he wants to make a spirit photograph." I inquired—"Is there a medium?" "No," he said; "he does not require one." I replied—"It is no use to try without." In the meantime I was introduced to a great man in these matters. I told him again it was of no use without a medium. Oh! he would get one. I said—"I will bet five pounds you don't." All was got ready, and before I sat I was invited into the dark room to see the plate taken out of the bath. I said—"I must see the plate long before it goes near the bath." This man discovered, for the first time, that all who *know* spirit photography to be a fact are not fools, and, if they have not double sight, they at least see singly with as much definition as many others.

I know photographers, as a rule, are very acute men, more especially those who live in a country like Scotland, where the air is *thick with spirits*, where all the people are so controlled by them that all earthly

* See Social Science report, Dr. L. Playfair.

interest is gone, and they are willing to live the life of the brute for the sake of the spirit.

Well, to conclude: I hope "Scotticus" has returned safely with an interesting collection; amongst them he may have some of the old savages, such as the "Dugald Creetur," or, perhaps, the old "Bailie" himsel'.

I have no doubt Scotland can ill spare so fine a "chiel" as "Scotticus;" when under the "influence" we see he can be a witty sort of a "chap."—I am, yours, &c., SCINTILLA.

October 10, 1874.

ON THE PREVENTION OF BLURRING.

To the EDITORS.

GENTLEMEN,—In reading over my letter last week after publication I find myself responsible for an error which, owing, no doubt, to the communication having reached you so late, escaped detection. In that communication I speak of the "*diffractive* power of glass," whereas my intention was to write "*refractive* power," &c.

In your last week's number there also appears a letter from Canon Beechey on this subject, accompanied by a diagram explaining the occurrence of blurring by reflection, and suggesting that the effect of such reflection ought to be the formation of a second image. Under certain circumstances this is undoubtedly the case, although Canon Beechey appears to have never met with it.

Some years ago, whilst working with very thin bromide films, I was frequently troubled with the very defect in question, and in such a marked degree as to suggest the idea that the camera had been moved during exposure. Having proved the impossibility of this theory I next blamed my lenses, though why they should render *some* subjects perfectly and double others I could not at once explain. Eventually I solved the difficulty by the use of a non-actinic backing.

In Canon Beechey's case the cause of the absence of this "doubling" effect is not far to seek. As he himself states, his films are ordinarily very dense, and I think I can show that this is quite sufficient reason for the non-appearance of the double image; indeed, with such plates it is quite probable that "blurring by reflection," as usually understood, does not occur at all. When a pencil of light strikes upon the surface of a prepared plate we know that a portion of its rays are arrested by the sensitive film, and do their duty in forming the latent image, the remainder passing into the body of the plate and suffering reflection from its internal surface on to the back of the film. Upon the density of that film, of course, depends the proportion of the rays absorbed and transmitted respectively—an extremely dense film possibly absorbing the whole.

In such a case there can obviously be no reflection from the back surface of the glass, and here Canon Beechey and myself agree perfectly. But what becomes of the rays of light which are absorbed by the film of bromide? My impression is that they still do mischief, and perhaps to a greater extent than if transmitted. I hold that the minute particles of bromide of silver forming the sensitive layer act as so many reflectors independently of one another, and that the pencil of light is thus broken up and reflected in every conceivable direction, becoming, as it were, so much *diffused light* within the film itself.

In the case of a film of less density—that is to say, one which allows a portion of the light to pass through—we shall have in addition the reflection from the back surface, but only in the case of very transparent ones can I imagine any danger of the double image.

In his diagram last week Canon Beechey takes no notice of the refraction which occurs when the light-rays pass into the glass, and an exaggerated idea of the probable effect is thus given. By the laws of refraction the rays in passing from a rare medium, as the atmosphere, into a denser one, as a glass plate, are bent in a direction towards a line drawn perpendicular to the surface of the refracting medium. If Canon Beechey will redraw his diagram on this principle he will find the distance very materially lessened between the points where the ray enters the plate and passes out again after suffering reflection. In practice, and with the ordinary thickness of glass used, the distance between the doubled images could be scarcely perceptible, even if the light were transmitted in straight lines; but, taking into consideration the dispersion it must suffer in passing through first the bromide film and then *two* thicknesses of glass, it becomes evident that the second image must be very much "out of focus" before it reaches the film.

The following appears to me to be the state of the case in connection with blurring:—A thin, transparent film requires a non-actinic backing, while a dense one should be coloured throughout. It is questionable, however, whether by any means in our power we can wholly prevent this defect.—I am, yours, &c., IGNOTUS.

October 12, 1874.

ANSWERS TO CORRESPONDENTS.

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

PHOTOGRAPHS REGISTERED.—

H. Sampson, Southport.—*View of Cambridge Hall, Southport.—Twelve Views of Southport Pavilion, comprising North Entrance, Band Pavilion, Terrace Front, Concert Room, Three Views in Conservatory, a View from the South-West, the West Front, Two Views in Grounds, and View of Promenade.*

F. G. ADAMS (Philadelphia).—Post-office order received.

GEORGE.—*Hot* water is not required for developing carbon prints; lukewarm water will prove to be much more manageable.

V. V.—We entirely share your opinion respecting the validity of the patent. We may, indeed, go a little farther, and say that it is not worth the paper upon which it is written.

T. STODDART, B. HAY, H. L., PHOTOLITHO., AND EDINA.—The process inquired about is at present a trade secret. We may probably publish it on a future occasion, but not at present.

RUSTIC.—The amount of halation in a picture does not depend upon the intensity of the light transmitted by the lens, but upon the light radiated from the atoms of haloid silver in the film, or that reflected from the posterior surface of the glass plate.

J. B. E.—Make the transparencies on plates three and a-quarter inches square, and, when mounting them, insert a dome or circular mat. Four-inch condensers will show these pictures well; those of three and a-half inches are rather too small, unless the picture be of a circular form.

ALBUMEN.—The way to albumenise paper is to float the sheets for a very short time over salted albumen. Mix with each ounce of albumen from three to six grains of chloride of ammonium, according to the strength of the silver bath employed. See that the albumen is beaten to a stiff froth, as little water as possible being mixed with it. Beyond these general instructions we cannot give you detailed lessons.

J. W.—Do not use glue or gelatine of such bad quality as that described. Immerse a small quantity of the gelatine in water for a few hours; then squeeze out the water, place the gelatine in a pipkin, and immerse it in a vessel of boiling water, by which the gelatine will be completely dissolved. Let the bichromate be present in such proportion as to make the film dry bright and free from crystallisation when spread upon glass.

ARGENT.—Try the effect of floating the paper upon, or immersing it in, hydrochloric acid diluted very slightly with water. The mode we adopt when we want to remove the size from paper is to pour a little common commercial hydrochloric acid into a flat dish, immerse the paper for a few seconds, and then wash copiously in water. After undergoing this treatment the size will be found to have been entirely removed, the paper being then quite bibulous.

THE EXHIBITION.—A. P. C., writing upon this subject, says:—"There are one or two things with regard to the present Exhibition and its management, about which I, as a member of the Society, should like to know somewhat. In the first place, what has the fact that a gentleman makes stencil-plates for marking linen to do with the Annual Exhibition of the 'Photographic Society of Great Britain?' as a gorgeous card announcing that fact and others cognate accompanied the ticket sent me. Why should the restriction with regard to *carte*-sized pictures, which last year prevented so many gems from appearing, be this year set aside without any notice either to members or the public? And why should 'coloured work,' as it is flippantly called, be sternly prevented admittance at the front door and be permitted to enter by the side one? As to the last question, I hope to be able at some future time to say something more fully, considering, in common with many others, that the present regulations are unwise, unjust, and injurious."

AN OLD PHOTOLITHOGRAPHER.—This correspondent, writing upon the patent obtained by Mr. Banks for producing surface blocks by the agency of photography, reminds us that we have on several occasions issued specimens with the Journal which were executed by a process similar to that now sought to be introduced as novel, and expresses his opinion that a patent of such a kind is not worth the paper upon which it is written. In this respect the "opinion" of our correspondent is in entire harmony with that of others who have written concerning it. The reproduced engraving of *The Bowstring Hemp Plant* that we published in 1868 as a specimen of a surface block by photographic agency was prepared in the following way:—A plate of glass was coated with gelatine, sensitised, dried, printed upon from a negative, immersed in water until swollen, and a cast taken from this in plaster-of-Paris, from which was obtained another in stereotype metal. But this process was old in 1868; for several years before that date we had described it, and issued specimens from blocks prepared in substantially the same way. It is now about five years since, in commenting upon a patent obtained for a similar method, we employed the following language, which we commend to the proprietors of Mr. Banks's patent:—"He (the patentee) has given utterance to a grave blunder which would almost induce us to believe that he is quite unacquainted with what has for years been familiar as 'household words' to every reader of periodical photographic literature"—the expression being that the property of sensitised gelatine swelling or not swelling when immersed in water according to the previous action of light "has as yet been practically unapplied." Now this action of sensitised gelatine is one of the most commonplace facts of the day; and, so far from its having been practically unapplied, we have almost within reach upwards of a score of photo-engravings and phototypes which owe their existence to this property, and nearly a dozen patents have been taken out for various ways by which it can be applied.

EXCHANGES.—In our next.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 755. Vol. XXI.—OCTOBER 23, 1874.

ON CERTAIN DEFECTS IN COMBINATION LANDSCAPE LENSES.

The particular defect in lenses which forms the subject of the present article has previously been discussed by various writers; but being of a somewhat composite order it is more than likely that the particular phase now to be considered has escaped the notice of those writers. The defect in question is the flare which frequently arises from the use of compound lenses when there is a very bright object in front, resulting in a ghost-like image of that object being thrown upon the plate. If the image of the object thus duplicated be in focus we designate it a "ghost;" if out of focus we call it "flare." And yet there is a distinction between one sort of flare and another. In one kind a false image of a radiant is produced always in the centre—in the axis of the lens; in another the image may fall upon any part of the plate. If the producing cause be directly in the axis, then the image of the radiant and that of the "ghost" will coincide in general position; but if the primary or principal image fall upon one side of the axis, then the ghostly image will be found upon the other.

There is an excellent photograph in the Exhibition of the Photographic Society, now open, in which a fictitious sun appears where no sun should be. This fact is in accordance with what is expressed in a letter we have received from a correspondent, in which the following remark occurs:—"The rapid rectilinear I obtained on your recommendation is absolutely perfect for the work for which it is obtained, but it gives an exceedingly annoying secondary or false image of the sun when I have occasion to take a view in which that luminary has to take a part." From these data we have been led to devote some thought to this subject, and we trust that the present article will, although not so expressed, offer such hints as may lead to the *cause* of a certain description of flare being recognised and comprehended by any patient and intelligent observer, and the *cure* placed within reach of those possessing a modicum of mechanical knowledge.

What follows is based on experiments made with the rapid rectilinear combination, believing, as we do, that it forms a capital representative of the very best of all the cemented compounds yet issued. With these observations, by way of preface, we shall go back a few years, and take a retrospective glance at what has been written on the subject of flare.

In the *Dictionary of Photography*, second edition, we find the following remark on the subject of flare:—"The cause of this has been a great puzzle to opticians and photographers. Some persons have supposed that it is the image of the round central stop formed by the back lens; but that idea is absurd, because if a bright object were placed so much nearer to the lens than its focal length no real image of it *could* be formed, for the rays would still be divergent and would cover the entire screen. Others have supposed that the round spots of light are produced by rays which have suffered internal reflection at the front lens; but that supposition is open to some fatal objections. The probability is that it is really produced by reflected light from the bright edges of the lenses." In the absence of more definite information we shall assume the above to be the opinions of Mr. Sutton; for, although the work in question was the joint production of that gentleman and Mr. George Dawson, of King's College, it is pretty generally understood to whom may be relegated the paternity of the optical articles in the work from which we have quoted.

We now advance a little further forward in point of time, and notice Mr. Dallmeyer's paper on this subject, communicated to the London Photographic Society in June, 1867, in which, alluding to Mr. Sutton's ideas on this question, he places in antagonism the remarks of the reviewer of that work in The British Journal of Photography, whom he (Mr. Dallmeyer) understood to be Mr. J. Traill Taylor, and which remarks were as follow:—"Having been led to bestow some attention on this troublesome phenomenon we arrived at a somewhat different conclusion from that we have just quoted; for we found that the flare proper—the small bright central spot—was present quite irrespective of the brightness or blackness of the edges of the lenses, and was caused by rays reflected from one of the surfaces of the back on to the posterior surface of the front lens, which, in turn, reflected it on the ground glass or sensitive plate." The opinion of Mr. Dallmeyer, as given in the paper to which we have referred, is that the central spot is really due to the formation of an image of the diaphragm.

There is, doubtless, truth in all these hypotheses; but the precise fact we at present intend not merely to enunciate but to demonstrate is that the view entertained by the reviewer of the *Dictionary f Photography*, whoever he may be, is in reality quite correct, and thi we do by an appeal to experiment.

Let a rectilinear lens be screwed into a camera, and a view of an ordinary gas light or a candle be focussed on the ground glass, the room being darkened. A "fish-tail" burner is best, on account of its form. Notice the brilliant, sharp, and beautiful image of the flame on the ground glass. This image is, of course, inverted, and we shall call it the "*primary*" image. But notice, further, that when that image is found a little way to one side of the centre of the focussing-glass a ghostal image, which we shall term the "secondary" image, is seen at the other side of the centre. It may not be quite so sharp as the primary image, but there it is, and, unlike the other, it is *non-inverted*. If it be not quite sharp it may be made so by separating the lenses by the unscrewing of the cell which contains the front lens. If the camera be slightly rotated, so as to cause the primary image to move in any particular direction over the ground glass the secondary, non-inverted, or ghostal image will be found to move in an opposite direction, both coinciding in position only when the axis of the lens is pointed directly towards the radiant.

By getting the secondary image near the margin of the focussing-screen, and then placing the eye in the line of that image and the lens, after withdrawing the ground glass we see the posterior surface of the lens to be a mass of light; it is, in point of fact, a concave *mirror*, and throws an image of the flame upon the ground glass. This experiment, which has been repeated with five different rectilinear lenses, *proves* the accuracy of the reviewer's remarks in this Journal to which reference has been made, and which were to the effect that the flare "was caused by rays reflected from one of the surfaces of the back on to the posterior surface of the front lens, which, in turn, reflected it on the ground glass or sensitive plate."

If further proof were needed it will be found in the following demonstration:—If the front cell containing the interior lens of the combination be partially unscrewed so as to be very loose—in fact, so loose as to be ready to drop out of the tube—and if this lens be kept firm by the finger and thumb, the primary and secondary images will be seen as before described; but now let the anterior lens be moved, or wriggled about, so to speak—which, in consequence of its looseness, may easily be done—and it will be seen that, while the primary image of the flame remains nearly motionless on the ground glass which forms the focussing-screen, the secondary image will be gyrating all over the plate.

From these experiments we believe we have satisfactorily proved that the kind of flare alluded to arises from the causes mentioned. Having demonstrated the source of the evil we shall now add a few words respecting its cure.

It is obvious that for general landscape purposes the description of lenses mentioned have been most carefully adjusted so as to yield the greatest flatness of field combined with the best definition, and that the circumstances under which these are obtained in the highest degree of perfection are unfavourable to the getting rid of the secondary image. What we have found in practice, after several trials, is that by effecting a compromise such as may be obtained by the approaching or separation of the lenses in the slightest degree—that degree, for example, involved in a few turns of the cell screw—the ghostal image will be so diffused over the plate as to become invisible without affecting in any appreciable sense the fine definition of the primary image. By the separation, or even by the approximation, of the front and back lenses the ghostal image, if sharply delineated, passes so rapidly out of focus that a very trivial unscrewing of either the front or the back cell suffices to banish that image without affecting the brilliancy or beauty of the primary image. Experiment can alone determine the amount in each case.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

[Second Notice.]

Mr. Vernon Heath—who, we are glad to see, has again entered the field as an exhibitor—contributes a number of views in Scotland and North Wales. Of the singularly-perfect rendering of the grades of distance in the pictures of Mr. Heath we cannot speak in terms of too high praise, for in such views as those taken of, or from, the *Plas Tan-y-bwlch* (Nos. 74 and 79) the force of atmospheric perspective "can no further go."

As an excellent specimen of composition printing, *The Gleaner* (No. 66), by Mr. Edmund Smith, will be appreciated as being better than several works of a similar character exhibited at previous exhibitions. It would, however, have been more perfect if the landscape portion had been rather less pronounced.

Mr. Faulkner's frame of upwards of a hundred portraits of children is exceedingly attractive, and should receive much more than a passing notice from visitors. We were a little amused a few days since at receiving a letter from a friend, in which appeared the astounding statement that for taking portraits of children the ordinary wet collodion process must now be considered as having broken down! If the writer could embrace the opportunity of seeing the large frame of Mr. Faulkner—these having all been taken by the "broken-down" process alluded to—he would assuredly make a reclamation of his assertion without a moment's delay. In our last Almanac we described the ingeniously-contrived shutter by means of which Mr. Faulkner is enabled thus to secure in an instant the "counterfeit presentment" of his "tiny sitters."

Those professional portraitists who are in quest of something a little out of the common with which to attract clients ought to examine three fine half-plate portraits (No. 75), by Mr. Hanson, of Leeds. These are by his "cretaceous" process, of which, so far as we are aware, no details have yet been published. The style is very effective.

Under the title of *Rambles with the Field Club*, Mr. Gale, a member of that fraternity, exhibits a large collection of charming little views taken by him on the occasions of the pleasant Saturday wanderings of the Club. Artistic and tasteful, the contributions of Mr. Gale to this exhibition prompt us to hope that he will enrol himself in the ranks of regular contributors. Mr. Gale works with wet collodion in a small tent—he has certainly done so on those occasions when we have been present at the club field meetings; hence he secures scenes of active life in his pictures, in some of which we find portraits of his fellow-members of the Club.

Mr. Bowen's four interiors (No. 90) of the *Baptist College, Regent's Park*, are admirable specimens of this class of work; while in the pictures by Mr. H. Paget Swaine, from dry-plate negatives, there are some excellent characteristics. We instance the *Italian Mule Path* and *San Marco* as good examples of Mr. Swaine's work.

The photographers of Brighton present a goodly appearance at the Exhibition. First of all, we have Signor Lombardi, who has sent a variety of charming portraits, and also a number of views of Brighton Aquarium; then we have M. Boucher, of the excellence of whose works we have already spoken; Mr. Mayall, who contributes an admirable collection of autotype enlargements, among the portraits exhibited being the placid face of Mr. J. A. Spencer looking down complacently upon scrutinising observers; and Mr. Fox, who exhibits views, interiors, and studies.

Colonel Stuart Wortley has sent three landscapes of large size taken direct. Of these we much prefer *The Hillside* (No. 98), the large circular picture which hangs in the centre at the north end of the large room. It is a superb work. From an intimation appended we learn that both it and the other two pictures were taken on uranium dry plates.

The Woodbury Permanent Printing Company exhibit very largely. Many of their works are intended to show the application of the process to book illustration, which they do in a most convincing manner; while in the production of lantern transparencies, of which there is a fine collection in one of the small corner rooms, the process cannot be surpassed.

Colonel Roche's view of *Tintern Abbey* is good, and several of Mr. Sutcliffe's views are really charming. Among the latter we may specially notice his *Autumn Sunset* (No. 117).

We described some weeks ago Mr. Werge's method of producing artistic effects in backgrounds. In two pictures, suggestively entitled *Before* and *After*, we have striking examples of what may be effected by means of the powder process. In one we have a portrait with a perfectly plain background; in the other a scene is introduced, the portrait being the same in both cases. It scarcely needs more than a glance at these pictures to assure the photographer of the great gain secured by the adoption of such a process as that so freely placed by Mr. Werge at the disposal of the public.

We this week present some opinions of what may be termed the "outside" press relative to the Exhibition. These will be found in a subsequent portion of the current number.

In our notice of the Exhibition last week, especially in the paragraph relating to the number of the competitors for the Crawshay prizes for direct large portraits, was embodied a sort of compound mistake, which we now rectify. First of all, by a printer's error, the *eight* competitors spoken of were magnified into "eighty." The P. D. of our printing establishment very naturally thought that such munificent pecuniary awards as those so generously offered by Mr. Crawshay must have attracted competition from at least eighty enterprising photographers scattered over the globe; and, let us give *our* "devil his due," such should have been the case. But not only was our mischievous imp wrong—so also were we. For our *eight* he gave us *eighty*: it so happened, however, that, after all, there were not "eight," but only *seven* competitors for the four prizes, these being, for the large heads, Mrs. Cameron, Messrs. Robinson and Cherrill, Mr. Crawshay, Messrs. Chaffin and Co., and Mr. Neilson; and, for the smaller heads, the additional names of Mr. Slingsby and Mr. W. Street. As already stated, Mr. Crawshay expressed himself quite satisfied with the distinction accorded to him by his committee in awarding him a prize, the substantial *honorarium* associated with which he transferred to Messrs. Robinson and Cherrill, who, for the large heads, stood next in order of merit to Mr. Crawshay. That our P. D.

should have imagined that for prizes of the substantial value of one hundred and twelve pounds sterling there ought to have been *eighty* competitors was somewhat natural; but, in point of fact, there were only SEVEN. "'Tis true 'tis pity, and pity 'tis 'tis true."

SOME EXPERIMENTS WITH SUPPLEMENTARY EXPOSURES.

Now that the summer is past and "gloomy winter" approaches, the majority of amateurs will be packing away their cameras, and resting on their laurels till "sweet spring" and actinism come round again. The professional photographer, however, is not so happily situated; he must keep on working all the year round, doing the best he can in dull November as well as in the "leafy month" of June.

Under these circumstances, the question of shortening the exposure becomes to him one of much importance, and, in consequence, one to which he is always ready to lend an attentive ear. From the fact, however, that we really do not yet positively know anything of the nature of the latent image, very little real progress has been made; and although many of our most scientific photographers believe that the image is produced by an instantaneous exposure, and that what is required is the knowledge of how to develope the impressed image, that method of development has not yet been discovered, and until the arrival of that fortunate time we must do the best we can with the knowledge we have.

Of the various methods of shortening exposure proposed during the past few years, probably none has received more attention and elicited more discussion than that of exposing the plate for a very short time, either before or after the ordinary exposure, to the action of weak diffused or monochromatic light. That some advantage might be derived from some such treatment had occurred to the minds of more than one experimentalist at an early period of the history of the practice of photography; but it took little hold on the popular feeling till Mr. Newton, of America, some years ago pressed the matter strongly on the attention of his brethren. Shortly after this the subject was taken up, not only there, but here and on the continent also, with, as is usual, very varied results—some operators finding, or thinking they found, their exposures shortened by nearly one-half, while others could see no advantage in it at all. It is somewhat curious that in this respect photography is, to a great extent, an exception to other branches of experimental science. In them, as a rule, when any discovery is published, it is at once put to the test of experiment by a host of manipulators, whose dictum is considered to be a satisfactory settlement of the question, and the alleged discovery is either admitted or condemned. But in the case of photography, there is no such short road to a decision; the alleged discovery goes the round of the photographic societies and journals, and affords matter for much private conversation, but it remains very much in the same state in which, according to Burns, the question of the changes of the moon at one time was

"By some believed, by some missdooted,"

until, if there be really anything in it, it gradually takes a hold of the public ear, and, if not, it quietly slips out of memory. The cause of this difference lies, no doubt, in the fact that the men generally who work at experimental science have had a special training by which their powers of exact observation have been educated, and their acquaintance with the material in which they work made perfect—a training which, I may safely say, the majority of photographers have not had, and from the absence of which their method of operation is, in many cases at least, more empirical than scientific.

From this cause, I believe, the proposal of a supplementary exposure has hung in a kind of equilibrium for some years; the advocates of green glass, red glass, opal glass, and a touch of diffused light maintaining that the system is a decided success, while the rest of the fraternity simply shrug their shoulders and "don't believe it."

With a view to contribute something to the settlement of the question, or, at least, to satisfy myself whether there really was anything in the proposal, I have made a number of experiments, the results of which I propose to record.

The experiments were made with a binocular camera, the lenses of which I knew to be perfectly equal in their action, and the caps were made of sheet gutta-percha, into which were fixed discs of green, red, and opal glass. The figure was lighted as near as possible to represent the ordinary circumstances of the studio, and the time required for fair work ascertained to be twelve seconds. A series of exposures were first made, varying from six to twelve seconds, when in each case one lens was covered by an opaque cap, and the other with the glass cap, through which the light was allowed to act for from one to fifteen seconds. I then repeated the experiments, but, instead of using the glass covered caps, I held cloths of various colours in front of, and at a distance of eighteen inches from, one of the lenses. I next substituted for the figure a scale of graduated tints, which I have found very useful for many experimental purposes. It consists of a black board, on which is painted ten bars, each measuring one by three inches, and passing from black at one end to pure white at the other. The same number of plates was exposed, under the same conditions, on the scale, and the whole batch submitted to the examination of a few friends of considerable experience, and on whose judgment I could rely.

The result of the examination showed unmistakably that, supposing the experiments to have been properly devised and fairly carried out, exposure to either a monochromatic or diffused light does not in any appreciable degree continue the action set up by the ordinary exposure, as in no case was there the slightest visible trace of the supplementary exposed half of a plate being better exposed than the other.

Although, however, this was the unmistakable result of the examination I am satisfied that, under certain circumstances, such a supplementary exposure will be a great advantage, especially if it be made through a pale-green glass—in the case, for example, of photographing a restless baby, where it is almost impossible to get the necessary exposure, and where, in consequence, the negative prints much too white and black. If the operator, while wishing to give five seconds, is forced from the motion of the sitter to give only three, anything that will slightly veil the too deep shadows will undoubtedly improve the printing qualities of the under-exposed negative; and this is just what the supplementary exposure will do.

If this be the true state of matters—and I have little doubt about it—it will be evident that there is no need for all the trouble of coloured glass or unusual appliances, as a blink of very weak diffused light in the dark room previous to development will do all that is required. I hope my experimental friends will set themselves firmly to solve the as yet unsolved problem of how materially to shorten the exposure, as I have no doubt that fame, and perhaps fortune too, awaits him who first succeeds. JOHN NICOL, Ph.D.

P.S.—Since writing the foregoing I have, in conjunction with a friend, commenced a further series of experiments, which show some curious results. As soon as they are completed I shall return to the subject.—J. N.

FUMING PAPER.

I THINK there is an objection to the American plan of fuming paper which I do not remember to have seen in print. It is the bad effect of the ammonia on the varnish.

This would, perhaps, be of no consequence when only a few dozen prints are wanted from the negative, as in most portrait establishments; but, for landscape and book work, where the number required is often reckoned by hundreds and thousands, the case is different. I have occasionally fumed the paper in winter, since the plan was first introduced, to save time, but have feared to go into it regularly for the above reason.

I have several negatives which have been almost constantly in use for from twelve to fifteen years, and as some of them could not now be replaced I should not like to run the risk without more information as to the effect of ammonia on the varnish than has yet been published.

Perhaps somebody in America can enlighten us. What is wanted is practical experience. Is the varnish rendered soft or rotten, and liable to be scratched by the slighest touch by frequent contact with ammonia paper? and, if so, does it recover its toughness when put aside for a time? or does it combine with the ammonia, forming a sort of resin soap, and becoming a very imperfect, if any, protection to the negative? As somebody once remarked, "an early answer will oblige." RUSSELL SEDGFIELD.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

IV.—SOLUTION.—EVAPORATION.—CRYSTALLISATION.

WHEN a solid or a gas is liquefied by being brought into contact with a liquid the act is called "solution," and the product is also so termed; while the absorbing liquid is known as the "solvent" or "menstruum." The pulverisation of solids will generally much facilitate their solution by offering a larger surface to the action of the menstruum; but with some bodies it will be desirable to take special precautions. Those, for instance, of a gummy or resinous nature are apt to take up at once a certain amount of the liquid, and form glutinous, tenacious lumps, which are most difficult to dissipate. To avoid this it is desirable to mix some inert, insoluble matter, such as sand, powdered glass, &c., with all substances of the kind; these, which act by separating the particles, almost entirely obviate the tendency to agglutinate, and materially help to quicken solution. If an equal weight of powdered glass, in particles about the size of a pea, be added to shellac or other resin, when mixed with spirit for making varnish, the solution will be effected in a very short time; while without this precaution it would take many weeks unless it were shaken up about every five minutes till dissolved, and this would be a very tedious operation.

In dissolving pyroxyline in a mixture of ether and alcohol it will not be possible to carry out this plan; and yet, unless it be very well pulled out and dropped in small pieces into the mixture, it will fall in lumps to the bottom of the liquid, and require much shaking before it will all disappear. But if a portion of the alcohol be kept out of the ether and used to moisten the pyroxyline, and then the menstruum poured on the moistened mass, the solution will be effected with ease and rapidity.

A few hints may be given here upon the use of the pestle and mortar in pulverising. Care should be taken so to place the mortar on the table that it shall stand immediately over one of its legs. The vibration necessarily caused by the concussion of the pestle will thus be very much lessened both on the table itself and in the room generally. It will be found advantageous to wrap a clean cloth round the pestle and mortar in such a way that the former is allowed plenty of play. By this means all the material operated upon will be kept in the mortar, instead of flying about the place in a manner it is impossible to avoid with some substances when such precaution is not taken. In striking with the pestle it should not be brought perpendicularly down into the mortar, but should first touch the bottom a little in front or a little behind the exact centre; the stroke is then completed by a sort of a slide to or from the operator. By working in this way the pulverisation may be done in one-fourth the time it would take if the substance to be powdered were struck straight down hammerwise. Also, a small quantity only should be put into the mortar at once; it is impossible to powder a substance if there be more than a depth of about a quarter or third of an inch in the mortar. When the material to be powdered is reduced to very small particles, then, and not before, can the action be finished by a circular motion of the pestle, which is to be held firmly in the hand, and a pretty strong pressure steadily applied. This latter method is called "trituration."

Many substances will dissolve readily in cold fluids without being first powdered—nitrate of silver or hyposulphite of soda, for example; while sulphate of iron is just the reverse, solution taking place *very* slowly if it be not powdered. But the student in chemistry will find that a multitude of operations in which solution plays a part will require special vessels not yet mentioned—flasks, evaporating dishes, beakers, &c., &c.

Flasks are useful in dissolving substances by the aid of heat; the evaporation is limited, and, when corked, they take the place of a bottle to hold the liquid, and can be put aside without danger while other operations are being conducted. They are made in a great variety of forms—round-bottomed, flat-bottomed, long-necked, short-necked, wide-necked, narrow-necked, and with scarce a neck at all. One or two of different sizes, flat-bottomed and with a neck neither narrow or wide, and perhaps a tube-flask—a tube with a small bulb blown at the end—will be all that a student will need at first for boiling or heating solutions. A beaker or two to hold the hot liquids will also be useful—a conical precipitating beaker, wider at the bottom than the top, being a specially serviceable vessel. The tube flask is useful when acting on very small quantities of a scarce or valuable material; the drops that spirt and splash during ebullition are caught by the sides of the tube and run back into the bulb.

For making chloride of gold a porcelain digester or beaker, egg-shaped and the mouth expanded a little, is an excellent little utensil, as it stands acids, and its shape is well adapted for the purpose. Lixiviating jars for cold liquids only are the cheapest and most useful forms of glass vessel for holding or making solutions in; they are rather tall and narrowed in the middle, being convenient for handling, as well as serving the special purpose the name of the jar implies—lixiviating—which consists in the extracting of the soluble matter from masses of material not wholly soluble. One or two glass stirring rods will also be needed; a piece of plain glass rod cut into lengths with the raw edge at the fracture taken off will answer admirably. A still simpler and more economical form will be found in slips of glass cut off the edge of broken glass plates; a 12 × 10 plate would furnish some dozens. If a good stout plate be selected the slips will serve all purposes. In placing the material to be dissolved within a flask it will conduce to neatness of manipulation, and it will sometimes be necessary to keep it from adhering to the sides of the neck. A narrow piece of paper doubled lengthwise, so as to form a sort of groove or channel, can be used for the purpose; the material can be placed at one end and conveyed to the bottom of the flask without allowing any of it to touch the sides.

Most salts will dissolve more freely and quickly in hot solvents, and where a strong solution is quickly required it will often be found advantageous to heat the menstruum first and pour it over the salt in powder or otherwise. Saturated solutions may be formed by adding the exact weight of salt required to the solvent, and then slightly heating or repeatedly shaking; or by heating an excess of salt in the menstruum and pouring off the solution from what remains immediately after cooling. The plan of making a saturated solution by constantly keeping an excess of crystals at the bottom of the bottle containing it, so often recommended by various operators, is most inefficient. As long as the bottle is at rest the crystals will, in a saturated solution, gradually increase in size, robbing the liquid, till in time it will become far from saturated. There are some solids which dissolve as freely in cold as in hot solvents, while some dissolve more freely. Lime water, for example, is nearly twice as strong when cold as it is when boiling. Again: some salts will dissolve more largely when another salt is present. Salts when in saturated solution will be partially precipitated when certain others are added, no chemical action taking place.

In most cases a fall of temperature takes place when salts are dissolved. This must be guarded against by the photographer, as the action of solution is sometimes so much retarded and reduced when cold. Hyposulphite of soda is a striking example. In dissolving substances that have been first pulverised they can be put direct into the menstruum if they are very soluble, bearing in mind the precaution named above; but if only slightly soluble, and heat is not practicable, it will be better to place the powder in the mortar and triturate it well, successive portions of fresh solvents being added till the whole is taken up.

In making solutions of gases—such as chlorine, sulphuretted hydrogen, &c., which are not very soluble—it will be desirable to have two stoppered bottles in use. These are filled about one-third full of water. The gas is directed into one till it is full, the atmospheric air being displaced. The gas delivery tube is then conveyed to the second bottle, and while it is being filled No. 1 is thoroughly well shaken, so as to bring every particle of the liquid into contact with the gas. The second bottle being now full of gas the delivery tube is taken back to the first, and the second well agitated. This alternate mixing and filling will soon saturate the gas more efficiently and more quickly than an elaborate array of Woulfe's bottles. Very soluble gases—such as ammonia, hydrochloric acid, &c.—need not be treated in this manner, the mere bubbling of the gas through the liquid being sufficient to saturate it.

Having described the methods of mixing solids and liquids together, I may now treat of the way to separate them again. If we wish to have the solid we resort to evaporation; and to distillation if the liquid only be needed, or if we wish to preserve both solid and liquid in a separate state. Distillation is also made use of for obtaining liquids in a greater state of purity, and for separating one liquid from another by taking advantage of differences in their boiling points.

For the purpose of evaporation there are dishes made of porcelain or glass and of common stoneware. The solution to be acted upon is placed in the dish, which is supported by a retort stand or a separate tripod, and heat is carefully applied by means of a spirit lamp or Bunsen's burner. It is often an advantage, instead of applying the naked flame direct, to place the dish in a vessel containing sand and sometimes water. The heat is then applied to this "bath," as it is termed, and the risk of burning the material is avoided. The evaporation will be much facilitated by constantly stirring the solution during ebullition. As it continues to lessen in bulk the substance held in solution begins to deposit upon the bottom of the evaporating dish, and continues to do so till all the liquid is driven off in vapour. It is at this stage that care is required to preserve the deposit from over-heating. If the material held in solution be a crystalline salt this deposit will also consist of crystals of ill-defined form. To obtain the crystals of regular shape and size the process of crystallisation is resorted to, which in effect simply consists in making a strong, hot solution of the salt, or evaporating a weak one till it becomes strong, and then allowing it to cool slowly and to remain at rest some time, when the first-formed crystals will increase in size. The liquid can then be drawn off and evaporated afresh for another crop of crystals, bearing in mind that the first crop is always the purest. The liquid remaining after crystallisation is termed "*mother liquor*," and will combine all the impurities originally present in the salt. The crystals will form in various places—on the surface of the liquid, and the sides and bottom of the evaporating dish. The hot, strong solution is often transferred from the dish in which the evaporation was conducted to other vessels of more suitable form.

This plan will, in fact, be generally advisable, as evaporating basins, being expensive articles, should not be subject to any unnecessary risk of breakage, and it frequently happens that the crystals attach themselves with great firmness to the sides of the vessel in which they are formed. A common method of crystallisation is to suspend strips of wood or pieces of string for the crystals to form upon; they will then be better shaped and more easily collected. It is a singular thing that in manufacturing large quantities the workmen have found that the crystals form much more readily if the string be drawn a few times between their hands (presumably not very clean) before being hung up in the solution. When crystals of great purity are required the first crop only should be taken, and they should be washed in either a small quantity of distilled water or, what is better, a small quantity of saturated solution of the same salt, for the purpose of freeing the crystals from traces of the mother liquor. This washing liquid should then be added to the bulk of the crystallising solution, and the second crop of crystals must be redissolved and recrystallised to ensure purity.

The crystals formed, the next operation is to collect them. This may, perhaps, in small quantities, be most conveniently done by pouring off the mother liquor and placing the crystals upon filtering-paper to dry spontaneously, or in a warm place to hasten the drying.

G. Watmough Webster, F.C.S.

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

By a Visitor.

It might have been expected that, under the stimulus of the prizes offered by Mr. Crawshay, the highest form of landscape photography would have been found in the room devoted to the pictures for competition; but this can scarcely be said to be the case.

The three pictures taking the £25 prize turned out to be old acquaintances, familiar to us in the shop windows for the last two or three years, and furnishing a fresh illustration of the proverb, that "one man may steal a horse, while another may not even look over the hedge." Rash, indeed, would any other person than the lucky prize-taker have been had he ventured to send old productions, and to indulge in the hope that they would even be hung. The three pictures, considered as *studies of clouds*, are fine productions; but in two out of three the landscape is so poor, and so subordinate to the sky, that they represent high-class landscape work very unsatisfactorily.

The three pictures selected for the second prize are illustrations of Welsh scenery, and therefore deserving the name of landscapes; but they are not as sunny as they might be, and are lacking in nice skies, otherwise they would have stood far beyond No. 1.

That the best and second best *single* landscape *(of any size)* should have been selected from the previously-mentioned pictures must have surprised many. It would be invidious to mention names; but two or three other exhibitors had each *one* picture equal in mechanical execution, but superior in feeling, to those chosen. One would like to see the purely artistic element more strongly represented among the judges.

Little need be said concerning the portraits offered for competition; the seven-inch head, taken direct in the camera, is still

"Monstrum horrendum, informe,"

and would I could say "cui lumen adeptum." The four and a-half-inch size gives charming results, and it is a pity that it should ever be exceeded. The seven-inch enlargements are much more satisfactory than the same size direct; but, wonderful to say, the prize has been given to those which are most "touched," although it had never been mentioned that the stringent prohibition issued last year against "touching" was withdrawn, so that those exhibitors who relied on pure photography find themselves left out in the cold.

There is much good work in the Society's Exhibition proper; but the delineation of "meadow, wood, and stream," and of buildings in particular, palls upon one unless relieved by natural skies or by some form of life.

Colonel Stuart Wortley shows three very fine views with clouds (Nos. 97-99) taken by his uranium process, and rivalling anything produced by "the dwellers in tents." Mr. Edmund Smith, a new exhibitor, has a picture of *A Gleaner* (No. 66), which, though a little sombre in tone, is very pleasing. His *River Leam* (No. 242) is bright and sunny, and *The Spring* (No. 68) and *A Warwickshire Lane* (No. 224), are promising works.

Something more poetical in treatment might have been looked for from Mr. Wm. Bedford, knowing how capable he is of it. His twelve landscapes represent good "commercial" work; but he has nothing to compare with his *Devonshire Cottage* of a former year. The best results are not to be obtained by artificial clouds worked on the negative.

Mr. Vaughan's *At Goring—Evening* (No. 268) and *On the Cherwell* (No. 269), though they have suffered in the printing, show a keen appreciation of effect.

Mr. Pendryl Hall has done justice to the old abbeys of Shropshire, and particularly so to *Buildwas Abbey—Nave and Chapter-House* (No. 146).

Mr. Vernon Heath's work is, as usual, good, but has a degree of flatness about it not altogether pleasing.

Mr. F. M. Sutcliffe's *Haytime* (No. 67) is a delightful little picture. Were the man with his foot on the wheel of the waggon absent it would be well-nigh perfect. Mr. Sutcliffe exhibits other admirable subjects. Mr. H. Whitfield, also, shows two pictures—*Summer Shade* (No. 77), and *The Hayfield* (No. 78)—which aim at something more than brick-wall delineation.

The result would have been more satisfactory had the Field Club arranged for its members not all to exhibit the same views. Kent is rich in material for the camera, so there is no excuse on that score; and the pleasure of comparing the varying degrees of excellence in work scarcely compensates for the monotony of subject. The members seem to have carried everything at Ightham before them with their "pop-guns."

Before passing from the landscapes it may be noted that Mr. B. J. Edwards's enlargements from Mr. H. Cooper's charming negatives are the most satisfactory I have yet seen, and approach nearest to the vigour and general beauty of the large size taken direct.

Mr. Blanchard takes the lead in figure subjects, his *Eastern Interiors* (Nos. 129, 130) deserving much notice.

The old lady in Mr. Bruce's *Biding His Time* (No. 155) is a wonderful study; but this and all Mr. Bruce's other pictures would, to my mind, have been rendered more satisfactorily on albumenised paper than by Obernetter's process.

Mr. Faulkner's *Studies of Children* (No. 69) are again most artistic, and rivet the attention of all who see them; while Mr. Rejlander, in his *Studies of Expression*, is quite at his best, and makes one long for some larger pictures.

Mrs. Cameron's subjects, as usual, show great feeling; they might, however, have been better treated, photographically, without this being lost.

Mr. Abel Lewis has some good portraits, but I miss his charming figure-subjects of last year.

The portraits, and enlargements (of which the Autotype Company make a great show), deserve a more extended notice than time will now permit.

A system of touting, by a person connected with an exhibitor of portraits, was rather an annoyance on the opening evening; and it is to be hoped that in future he will be "conspicuous by his absence."

FOREIGN NOTES AND NEWS.

M. Silvy's Waxed-Paper Process.—Hermann's Enlarging Apparatus.—Formulæ for Manipulating.—Suboxide of Silver.—Early History of the Process of Daguerre.—Fromme's "Mass-und-Gewichts-Kalender for 1874-6."—The Scientific Use of Photography.—Two Causes of the Rapid Yellowing of Photographs.

M. Silvy informs us that he has at length perfected a very fine waxed-paper process. The negatives, he says, will bear comparison in point of sharpness and gradation with those upon collodionised glass, whilst they have the advantage of being less hard, less troublesome to take, and, consequently, more suitable for the purposes of a tourist.

He has been led to experiment with waxed paper in consequence of the horror he has conceived of the poisonous chemicals employed in the collodion process—the cyanide, and the vapours of ether, acetic acid, ammonia, &c.—which infest the atmosphere of the dark room, and which have caused him to lose his health most grievously, but more particularly the incautious use of cyanide of potassium.

This new paper negative process is, we believe, more especially intended for use with a panoramic camera, fitted with a panoramic lens, and with a pair of cylinders round which a long band of sensitive paper may be wound. About six years ago M. Silvy showed us a waxed-paper negative taken in an instrument of this kind. It was about a yard long and six inches wide, and included 360° of angle, the view being taken in the neighbourhood of Paris. As a specimen of waxed-paper work it was decidedly the best we had ever seen, and the definition was faultless. If M. Silvy have improved much upon the process which he used then he will, indeed, have made an important step in our art, and we await with impatience further information on the subject.

M. Hermann has invented an apparatus for taking enlarged photographs of opaque objects, such as *carte* portraits, cameos, coins, &c. It consists of three parts, viz.:—First, a spherical reflector, by means of which the rays from a lamp are directed through a powerful lens, and then illuminate at an angle of 45° the object to be copied; second, a sort of camera forming an elbow at right angles, with a frame inserted at the top of the angle, in which is placed the object to be copied; third, a common lens. The whole is of small size, and can be placed upon a table or suitable support, the reflector being fitted with a straight tube or chimney to allow of the escape of the smoke from the lamp. An easel carrying a screen, which can be placed at any required distance from the apparatus, completes the equipment. In general a magnesium lamp is employed; but a common oil lamp will answer the purpose in some cases. An enlarged image of the object is thrown upon the screen, and may be received upon a sheet of sensitive paper or collodionised glass plate, which is subsequently placed in the same position.

A skilful French amateur, M. Andra, who has tested the apparatus, has exhibited an enlarged portrait taken with it from a *carte* print, by means of an ordinary lamp, in ninety seconds. A good result can be obtained when a five-franc piece or a butterfly is substituted for the portrait. A negative having been thus obtained, it can be easily retouched, especially by the Lambertype process. M. Andra, we may observe, was the exhibitor of some of the finest landscape photographs in this year's exhibition of the Photographic Society of France.

Here are a few more useful formulæ from the *Conférences sur la Photographie*, or lectures delivered by M. Davanne, at the *Ecole des Ponts et Chaussées*. Encaustic for positive prints:—

Essence of turpentine	100 c.c.
Gum mastic	10 grammes.
White wax	100 „

Filter whilst warm.

For the treatment of residues:—

Residues of all sorts (sulphides having been previously roasted)	100 parts.
Carbonate of soda, dry	50 „
Nitrate of potash	50 „
Common sand	25 „

Stir the fused mass with an iron rod.

Or—Dry chloride of silver	100 parts.
Chalk	60 „
Pounded charcoal	4 „
Or—Ashes of silvered paper	100 parts.
Dry carbonate of soda	50 „
Sand	25 „
Or—Roasted sulphides	100 parts.
Nitrate of potash	100 „

Stir the fused mass with an iron rod.

The last number of the *Bulletin* of the Photographic Society of France contains, amongst the extracts from foreign publications, the theory of the latent image and of alkaline development given by Captain Abney in his recent *Manual*. This has been reproduced without any editorial comment; nevertheless, there is a formula in it against which we imagine French chemists would protest, inasmuch as it involves the expression for that very hypothetical and improbable substance, suboxide of silver, the formula for which is stated to be Ag_4O. According to the *new* chemical notation, which Captain Abney sometimes employs, this would make oxygen a triad—an assumption which is inconsistent with the fact that it always appears as a dyad in known chemical reactions. But, supposing the *old* notation to have been employed in this case, that would make oxygen a hexad, and it would be the only known instance in chemistry in which it so acts. In short, the existence of a suboxide of silver is in the *highest* degree doubtful, and, therefore, any hypothesis of the latent image or of alkaline development which involves the presence of this substance must be regarded as wild in the ex'r·me. We hope, for the reputation of one of our foremost explorers in photographic chemistry, that Captain Abney will reconsider this formula in the next edition of his work.

A gentleman who preserves his incognito has written a curious letter to the *Moniteur* respecting the early history of the process of Daguerre. It appears that in 1839, a few weeks before the completion of those experiments which in June of that year led to the publication of the process by its author, his diorama in the Faubourg du Temple was burnt down. The fire brigade, from their barracks in the Faubourg St. Martin, were promptly on the spot with their various engines and appliances, and were about to throw their jets of water upon the burning diorama, when Daguerre, frantic with anxiety, besought the officer of the brigade to strive rather to save an old house adjoining, in the fifth story of which he said were articles of infinite value to the human race, relating to a discovery of immense importance on the very eve of completion, and which had occupied his most earnest labours during fifteen years. The officer yielded to the prayers of a man already well known for ingenious discoveries, and the old house and its contents were saved. The anonymous author of the letter referred to is supposed to be the officer himself. The editor of the *Moniteur* states that, when a child, he was himself present at the burning of the diorama.

A publication—Fromme's *Massund-Gewichts-Kalender* for 1874-6—showing the old and the new systems of weights and measures in Austria, is reviewed favourably in Germany. It is astonishing with how much matter the 207 pages it contains are filled; and, being prepared by one thoroughly acquainted with that class of figures, it is looked upon as complete and indispensable to almost everyone who has to do with Austrian weights and measures. As the new system will be introduced on the 1st January, 1876, the volume in question will furnish, by its timely publication, a means of becoming accustomed to the approaching change.

It appears that in Washington a great number of negatives are stored up, the result of government-authorised scientific expeditions, which have been accompanied by a photographer. Some of them are 12 × 10 inches in size, many smaller, and a large number in stereoscopic form. The peculiarities of a newly-explored country can thus easily be displayed in illustrations of the greatest interest. It is a matter of regret that the United States Government should not take steps to publish these interesting plates. Specimens can only be obtained by special permission, and complete collections are scarcely, and with great difficulty, to be got at. It is suggested that some of the series should be distributed gratis, and others sold at cost price. The number of large negatives is thought to be quite 1,000, and of the stereoscopic negatives 2,000 to 3,000.

Herr Fritz Haugk, in the *Photographische Correspondenz*, arrives at the conclusion that photographs should be dried as soon as possible after development, and recounts two circumstances which support it. It is well known to experts that pictures which become metallised by a too strong light have a drab, smudgy appearance. It may be no less obvious that too much glare of daylight is to be avoided also in the fixing process. "Some time ago," says Herr Haugk, "I fixed at midday some dozen pictures which were designed for my album. Being called away for a few moments I placed the still sensitive paper in the open air, and afterwards fixed the image in the same place, direct sunlight being of course excluded. All these pictures have become bright yellow, while others, which I on former and succeeding days dealt with otherwise, still retain their original whiteness. A careless washing of the photographs in question can hardly be charged with this result, as they had been thoroughly cleansed." Herr Haugk also instances another case leading to the same result:—"I had placed on one side some pictures, also destined for my album, after retouching, and pressed them down with some books. They remained there, neglected, about twenty-four hours, and the whole of these pictures show a bright yellow shade; while others, taken at the same time, show no trace of changing colour."

EX-STUDIO PHOTOGRAPHIC PORTRAITURE.

In all professions which involve the higher exercise of mind, and which entail the necessity for constant and subtle thought and rigorous action, there are but few who reach the highest or best attainments. In the mass of living men by far the larger number rise just high enough to be heard by themselves; a lesser number rise to make their confused noise heard by those near them; few, very few, stand out like mountain peaks far up in the clear atmosphere, drawing by the magnetism of their excellence all other minds after them. Of the millions who work few exceed commonplace routine. The men who control are few. Many paint, but great artists are scarce; many write books, but few books are read a second time. How many mechanics have to work and die for every true inventive mind that is produced! Men who will accomplish the best—men who will do whatever they undertake well—men who are restless and feverish, who cannot eat or sleep if they see a point above them which they cannot reach—men who will affirm of themselves that what others do they will also do—such men are the "fittest," and are rare.

And of photography—more especially of portraiture—is it true that of the thousands who are engaged in its practice the greater number by far, in spite of the journals being loaded weekly with practical wisdom—the best men, with great generosity, freely giving their hardly-worked-for experience in their pages—never rise above the plane of the veriest commonplace? they never get above the "community of drudges;" they are, and will remain, "third-class" to the end of the journey. A respectable few —not first, but second-class—imitators, and not bad followers, in many instances accomplish much good work; and I doubt not many are really in the best positions, if money be considered the only measure of success. But how very few work the art of portraiture to its best!

Not long ago I had some work sent me from the Isle of Man. Its beauty struck me so forcibly that at first I thought it due to some method unknown save to the artist; but on further inspection I saw the beauty was only the result of judgment in art, or, in other words, a knowledge of what was required to be done, and a careful, industrious, patient application of such knowledge.

In Ryde, last August, I spent some time with Mr. Saunders (of Hills and Saunders), who, with his intelligent assistant, were on their return journey to Windsor after spending some days at Sandown photographing the future Emperor of Germany, the Princess, and their family. I wondered that an artist should be sent for from Windsor to do such work. That, however, is not now my business.

My business is not concerned with *why* the work was done, but with *how* it was done. As to the chemistry, I was informed there was no speciality; as to the mechanics, all was perfect. They had to work away from all the usual fittings of a studio, only using the surroundings of an ordinary villa and garden. But in their large travelling-van all necessaries were to be found; nothing left behind to be extemporised, nothing left to chance—all the antecedents to a splendid result were there. Lenses to suit all conditions of distance; backgrounds; shades of all necessary forms; and, lastly, what was absolutely necessary more than all the rest—most energetic brains.

Mr. Saunders told me he would send me a set of pictures illustrative of their journey to Sandown, and recently I received a set of five of the finest cabinet portraits I ever saw. Four of them (one of which is a group of the Royal parents and five children) are, as portraits and works of art, simply faultless. The fifth picture is very fine, but has slightly too much light upon the face, although not sufficient to damage it in the least as a beautiful portrait; the eyes are free, and the pose and expression all that a critical taste could desire. The four above alluded to—whether the careful balance of the pictures be looked at, or the soft light and shade, the exqusite texture and delicate modelling, the perfect drawing, and, lastly, the fine portraits of the originals, be considered—are studies well worthy of all portrait photographers who have not yet attained a position amongst the first of the profession.

When it is remembered that these pictures I write about, and which, I believe, are already to be seen in the publishers' windows, were taken out of doors—and all know the extreme difficulty of such work—I will be considered as doing my duty in directing attention to them as containing points of excellence attained under most trying conditions. The pencil has been most judiciously used, but only as an auxiliary; its work is carefully kept in its place.

JOHN BEATTIE.

A CONTINENTAL PRINTING ESTABLISHMENT.

WHEN Mr. Wilson, of the *Philadelphia Photographer*, visited Europe last spring he devoted two days to the inspection of the famous printing establishment of M. Braun. His account of this visit is described in that journal in the following terms:—

FROM the Alps straight to Paris, *viâ* Basle, Berne, &c., stopping only at Dornach, on the Rhine, to see Adolphe Braun the great carbon printer and his great manufactory, for such it is, and there is no other just like it or as large in the world. Here the beautiful carbon process, which has been attempted and thrown aside by so many, and which *no* one in this great country works to any extent, is conducted on an immense scale, and for the two days I was there I found much to interest me in the establishment of M. Braun. The kindness I received from him made me desire to remain two weeks. Photography had already made us familiar with each other's faces, and a long correspondence had made us friends. He employs over one hundred persons constantly, and with him I visited the several departments.

Carbon tissue, as you remember, consists of a coating upon paper of gelatine mixed with a pigment, and made sensitive to light by bichromate of potash. It is then printed the same as albumen paper, transferred to a sheet of caoutchouc paper, the picture developed by means of hot water, and then transferred again to the sheet of paper upon which it is to remain permanently.

And here we see all these operations in all their details actively engaged in by the hundred or more *employés*, and be assured it is done on a large scale. Here are the grinding-machines for grinding the pigments, ten in a row, wagging their heads in all directions like so many lunatics who have lost control of their necks, but at the same time accomplishing their purpose; the room where the paper is coated, by allowing it to pass over a tank of the melted gelatine mixture by means of rollers, the paper just taking up enough for the purpose as it passes over; the drying-room, where we see thirty strips of the carbon tissue, fifteen feet long and three feet wide, hung there yesterday evening to dry over night for the consumption of the printers today; the printing-room, where is, indeed, a busy, busy scene—men handling negatives, great and small, and tearing off the paper as wanted; the transfer-room, where the caoutchouc paper and the tissue are pressed together, and then, with the aid of the benzine, are separated, and the transfer made; the developing-room, where the great tanks are steaming, and the workmen busy and as attentive as all good printers should be when they tone their prints, for the quality of the carbon print depends much upon the length of time it remains in the warm water; the drying-room, where the prints are dried previous to the second transfer; the mounting-room, where gum arabic is the mountant; the touching-out room, where all defects are obliterated, and where the titles are put upon the pictures, mainly by hand; the press-room, where ponderous presses finish the work; the store-rooms, where the finished pictures are kept; the sample-rooms, where proofs of all the negatives are kept; two skylights, one for copying and the other for portraiture; the offices; the engine-room and engine; and last, but not least, a large basement devoted to the Woodbury process, which M. Braun also uses largely.

Photographic printing on such a scale I had never seen before; neither had I ever witnessed such a scene of activity in the interests of photography.

M. Braun turns out from two to three thousand pictures every day. Almost everything in the photographic line he makes; but the speciality which has given him fame, and entitles him to the everlasting gratitude of the civilised world, is the reproduction, in indelible form, of the great masterpieces of art which are found in the galleries of Europe. As literature for a thousand years was imprisoned in cloisters, so has art for centuries been imprisoned in the few great museums of Europe. But we have come upon a new dispensation, and it is possible now for every school and college in America to possess faithful copies of the immortal masterpieces of the chisel, the brush, and the pencil, and every boy and girl in their teens may know Phidias, Michael Angelo, Raphael, and the rest of the "great cloud of witnesses," by a sight of their great deeds.

How many years had I longed for the privilege of wading through his sample portfolios! and here I did it, making selections which now not only bring to my mind constantly the original gems among which I have been wandering, but also are a continual help and delight to me whenever I can turn aside from work and plunge into the bewitcheries of the beautiful.

M. Braun has over 10,000 negatives stored in his works, in strong boxes, as I saw, most systematically numbered and classified, and at his villa near by is a set of duplicates. Some of these negatives on plate glass are of immense weight. I never saw an establishment where all things worked more harmoniously together, or where the results were so beautiful; neither did I ever see a man who seemed so utterly wrapped up in his chosen art as M. Braun. The work he has undertaken alone is a magnificent one, and he has been truly called the "Guttenberg of art." He has placed within the reach of all copies of the works of the old masters, which, heretofore, only the favoured few could go to the galleries of the originals to see.

When I think of the days I have spent with him I feel as if I had been with one whose fame is more deserved than that of poet or statesman. It was a privilege not to be overvalued.

OPINIONS OF THE DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Last night the new session of this Society commenced its operations by the usual exhibition of photographs, which was held this year in the Suffolk-street Gallery. The Society does not seem to have suffered by the change of locality or the change in the time of meeting, which has also been altered from November to October. Although the rooms of the Society of Artists, where the *soirée* was held, are very spacious, they were not more than sufficient to accommodate the numerous specimens of photography which had been sent in, nor could the President of the Society, Mr. Spiller, find fault with the number of visitors who attended on this, the nineteenth, anniversary of the exhibition. There were altogether 466 exhibits, besides miscellaneous specimens displayed on the central tables, containing an album of portrait enlargements (Crawshay competition), by Carlo Ponti; transparencies of sculptures in the Albert Memorial Chapel, by the Misses Davison, &c. The exhibition consisted, as usual, of portraits, landscapes of celebrated localities, sketches of nature, animals, plants, and curiosities. It would be quite impossible to do anything like justice in detail to the merits of the artists where all can pretend to some degree of excellence, for it is certain that without that attribute the pictures would not find a place on the walls of the Society. Mr. Robert Crawshay has continued his gift of prizes for enlarged landscapes and portraits this year, and these represent a very notable section of the exhibition. There is also a large series of views from New Zealand, India, and the Asturias. The contributions of Messrs. Spencer, Sawyer, Bird and Co., are also numerous, and will attract notice. Messrs. J. E. Mayall and Co. send some excellent portraits. Lieut.-Colonel Dixon has various representations of scenes and places of interest in India, and Lieut.-Colonel Roche of places of interest and beauty nearer home. There are some excellent exhibits by Ferranti, Lombardi, Valentine, Blanchard, &c.; but, as we have said, it is impossible to mention all. There are three contributions, however, by Mons. L. Bertin, Nos. 93, 207, and 213—all figures—which deserve notice for the vigour and judgment of their execution. There are but few instantaneous views and dry-plate subjects, but there are some examples of the earliest preserved plates. There are numerous representations of the mechanical printing processes, and some enamels. The exhibition will remain open till Wednesday, the 5th of November, from ten a.m. till dusk, and on Monday and Saturday evenings from seven till ten.—*Daily News.*

The Annual Exhibition of the Photographic Society of Great Britain.—Right were those, indeed, who used to predict in the early days of Talbotype work, when the tentative steps of the artistic explorers over ground where they were met at every turn by the difficulties of chemistry, a science very little known to them, that the art was in its infancy. The pallid, washed-out specimens of what we may fancifully call "prehistoric" photography—lent the Council for this occasion by the President, Mr. Spiller, F.C.S., and numbered 408, 412, 415, and 416, reminding us very comically of our early studies—give rise to a reverent thought of Fox Talbot, and to a feeling of gratitude that it has been permitted to us to witness the splendid development around.

The Council, no doubt, found a somewhat heavy task before them if they took possession of this ample suite of rooms with any idea of covering the walls; but it must be admitted that they have gone far towards that end. They have covered, in fact, all the space available in the principal gallery and three smaller ones, and no justice could have been done to another row above the line had they attempted the experiment. Now let us take notice, in the first place, of the "Crawshay competition" works, in portrait and landscape, this being the principal feature of the exhibition, although we shall have to deviate from the numerical order of the catalogue—in fact, to begin in the middle. Most agreeably for the Society of which he is a member, Mr. Robert H. Crawshay, a master of high-class photography, has been so dealt with by circumstances as to be in a position, not merely to indulge his taste for the pursuit to the utmost, but also generously to stimulate the ardour of his fellow-workmen in the craft. He has this year given for competition, and not for the first time, certain Crawshay prizes as follows:—"The first is £50 for the best collection of three photographs of heads taken direct from life, not less in size than twenty inches by sixteen, and the heads not more than eight or less than seven inches in height. The second is £25 for the second best collection of three heads. The third is £25 for the best collection of three heads, fifteen inches by twelve over all, and the heads not less than four and a-quarter inches long. Prize the fourth is £12 for the second best similar collection. The fifth is £25 for the best enlargement, not less in size than twenty inches by sixteen, by any method. The sixth is £25 for the best collection of three landscapes, not less than ten by eight inches; and the seventh £12 for the second best. The eighth is for the best landscape of any size from nature." This is a very open race, with many fit starters in the profession, to the second of whom Mr. Crawshay has allotted a consolatory £5 prize. For the portrait prizes there were twelve or thirteen competitors sending fifty works, most of them elaborate, many of them beautiful, some even too conspicuously so; but this is quite a matter of taste. One might as well desire a lovely woman to be plain as ask her to disguise her charms in shadow and rags with any good grace; therefore, of course, the majority of sun-portraits continue to reflect, immortalise, and enhance the charms of the toilettes as well as of the sitters, although such highly-decorated objects do not find equal favour with the judges. The first prize has fallen to Messrs. Chaffin and Son, of Yeovil, who exhibit six portraits, three in the two first classes, numbered 337 to 342, all remarkable for the apparently complete absence of affectation both in the sitters and the treatment generally. The second prize in Class I. was decreed to Mr. Crawshay, whose gamekeeper's head (332) is a powerful work, worthy of the honour. Retaining this the giver of the prize waives his claim to the substantial outward evidence which passes into the worthy hands of Messrs. H. P. Robinson and N. K. Cherrill, of Tunbridge Wells. These thoroughly able artists have the second £25 prize in the first class, and the first £25 in the second class. The £25 for the best enlargement goes to Mr. C. Ferranti, of Liverpool, exhibitor of Nos. 317-320, four enlarged photographs. Among the competitors in this class we find the accomplished Mrs. Julia Cameron, a popular artist of the first rank, esteemed almost as an artistic prophetess by a large section of tasteful society. W. Street (of Waterford), W. Neilson (of Edinburgh), Vandyke and Brown (of Liverpool), B. J. Edwards (of Hackney), the Woodbury Company of Hereford Lodge (Brompton), and Mr. John S. Palmer (of Stonehouse), with an extremely pleasing collodion transfer on toned paper from a small untouched negative, are all found among the runners, and, in sporting phrase, deserve places.

In the Crawshay landscape stakes Messrs. Robinson and Cherrill again carry much, if not all, before them. Their three exquisite productions, Nos. 276, 277, and 288, severally entitled *Repose*, *Under the Greenwood Tree*, and *Declining Day*, prove that neither the taste nor the skill have waned that presided years ago over *Bringing Home the May*, and subsequently over *The Willow Tree Aslant the Brook.* By the gift of intelligent selection of subjects, coupled with a happy combination of parts and skilful handling, these gentlemen succeed in obtaining effects hardly to be expected by outsiders, or to be rivalled by professionals.

The second prize, "for any landscape," was hard to win among so many able starters; but as more than one could not have it, No. 286, one of several splendid examples of Welsh scenery, by W. D. Sanderson, of Deansgate, Manchester, was pronounced the winner, and worthily deserved it. *La Ville d'Eu* (293), in the immediate neighbourhood of the constellation above referred to, was printed as long ago as 1869, by Mr. Sydney Smyth, and is a beautiful work. There is a weird solemnity perfectly riveting about J. Brier's *Pandy Mill* (302), and Mr. Henry Piper's foreshore effects from the wild coast of York and Durham (306) are as happy and original achievements as can be imagined within the present known domains of photography. Among the as yet undecorated competitors, whose claims on various grounds may have somewhat puzzled the judges, are many pleasing and romantic subjects. Such, for example, are the *Berwickshire Glen* (253), by G. Bruce; an enlargement of a very popular mill subject among Devonian rocks, by Mr. B. J. Edwards, of Hackney; a delicate morsel or two, at Goring and on the beautiful river Cherwell, near Oxford, by J. Vaughan (268 and 269); and a *Lock on the Avon* (272), by the same tasteful hand.

Having dealt to the best of our ability with the prizemen we may now notice some of the more prominent of the non-competitors, to whose works the fall of day permitted us to give some measure of attention. The frame No. 1 displays six "photographs finished by the process" of Mr. H. Vanderweyde, the process being apparently a very pleasing and successful application of chalk with occasional Indian ink, somewhat in the familiar manner of Mr. Frederick Piercy, who has for some years had repute as an able adapter of photography to portraiture. Next to these, but yet unnumbered, appeared a series of twelve telling copies of marbles from the International Exhibition, by Mr. W. England—we presume a member of this Society's Council; also a frame of clever "scraps of expression," without pretence of decorative make-up, by O. G. Rejlander. Next follow Nos. 7 to 14, eight of Valentine Blanchard's recent triumphs, including faithful likenesses of such public men as Messrs. Dillon Croker, Manville, Fenn, and Barry Sullivan. The permanence of modern photographs from the studios of our leading men seems now fairly enough ensured to guarantee to those of Mr. Blanchard, and it may be others, the future dignity and estimation of family portraits. Our artist has here a number of other specimens of his excellent quality, which it were needless to particularise.

We now come to a very long series of permanent works called "autotype plain enlargements," by Messrs. Spencer, Sawyer, Bird and Co., of 36, Rathbone-place, after small negatives taken from a great variety of original subjects by different hands. The landscape study of a cottage *ornée*, near Cookham, nestling among the piled-up woods that fringe the river bank, is a delightful *souvenir* of a well-known and well-loved locality. The firm also exhibits two very fine and large tree studies from other localities, and a magnificent Chinese "joss-house" or temple, from a negative taken on the spot by J. Thomson, Esq., F.G.S. These three studies are at the south end of the principal room, and are an imposing feature of the exhibition. The same exhibitors, again, show autotype prints, on both panel and canvas, to be used as permanent bases for colour; selections from Turner's famous *Liber Studiorum;* printed autotypes of machinery, engravings, and other objects—all valuable aids to what may be termed "trade photography." The small study by Hugo Thoile (52) of an admirably-dressed child artistically posed in an arm-chair is clever enough to arrest attention *en route* towards Vernon Heath's collection, of which the *Ben Venue* (63) and *Waterfall* (74) seem to be the masterpieces. This eminent artist is fully represented also in other parts of the rooms, but does not enter himself in the competitions. Mr. Edmund Smith, of Leamington, in No. 68, *The Spring*, and others, indicates successfully a loving regard for the manner of the Tunbridge experts. M. Boucher and Signor Lombardi, of Brighton, exhibit captivating recollections of Brightonesque portrait subjects; it were hard if they could not find stimulus to exertion in the fair and young o a locality where purity of atmosphere also lends its best assistance to the work. The heads of Sir R. W. Carden also are among the most felicitous of the latter artist's flights. The *Carnarvon Castle* and *Low Water* (97 and 99) by Colonel Stuart Wortley, both done by his "new dry uranium method," are splendid pieces of nature. The term can hardly be applied, perhaps, to the grand pile of the building, but it may be to the characteristic foreshore. One is disposed to return to them again and again—they are so very natural. The frame No. 107 is important, from a business point of view, as containing impressions from valuable prints, printed by the Woodbury permanent mechanical process, at their Hereford Lodge works. To this complexion has photography come at last, and so has Sol himself been harnessed to the Muse's car. In our haste we have omitted the beautiful *Autumn Sunset* (117), a fine study by F. M. Sutcliffe. *Buy my Caller Herrin'* and *Do You Think So?* (164 and 165), studies by H. C. Cocking, of Peckham, are most attractive, and quite as much can be said of four studies from the Woodland (170), by Mr. E. Fox, of Brighton. Messrs. Mayall and Co. contribute a fine series of large portraits (178-180), comprising Dr. Pritchard, Dr. Benson, J. A. Spencer, Esq., Miss Leith Hay, and Madame Patti. Mrs. Cameron's works, as usual, claim attention by their peculiar characteristics, and we find many of her pieces more comprehensible than ever by common folk, and, therefore, more welcome. The *Lady Hood and Children* (181), *Miss Bateman* (182 and 203), and *King Henry* (205) are not too deeply immersed in mysticism to have their charms unnecessarily obscured. Mr. J. Werge, of Berners-street, has sent, under the name of *The Children's Portrait Company*, a number of very pretty portrait studies of nude children, sparsely draped, but not indelicate—a new and interesting idea, at all events, to the general public. The Woodbury Company's illustrations to Messrs. Nasmyth and Carpenter's work on the Moon (135) are, like all lunar photographs, awfully suggestive of a huge volcano land. But we must here bring our remarks to an end by recommending an attentive perusal of the large transfer collodion enlargement (132), by Jabez and Alfred Hughes, of Ryde, of a painting of a lion's head, by Sir Edwin Landseer. The original is in the possession of the Queen, and is probably not the worst specimen of the master known. The transcript in Suffolk-street will be found a leading feature of the exhibition. We have left Her Majesty and her treasure to the last, so who can find fault if he be unnoticed now for want of room?—*Morning Advertiser.*

PHOTOGRAPHIC SOCIETY'S EXHIBITION.—The Photographic Society of Great Britain have now on view at the Gallery of British Artists, Suffolk-street, Pall-mall, many examples of the skill of the more distinguished members of the profession. We may thus note the changes and improvements of the year made in the practice of an art which has become of interest more or less to every home.

Among the portraits, those by Mrs. J. M. Cameron would seem to take the highest place, because they best realise the style of the best painters, past and present. Take for examples the portraits now exhibited by this lady of *Little May Maurier*, *Egeria*, and *Little Rachel Guerney*, taken direct from life. The light and shade call to mind the best pictures of the old schools. The portrait of *May Maurier* delights by its subtle low tones, which soothe the eye as much as some specimens in the same room distract by their abruptness and want of harmony. Mrs. Cameron's head of *Little Rachel Guerney* wears a peculiar lustre—the eyes are mirrors of light; while *Egeria* will claim attention for the nice care shown in the modelling of the face and neck. Whoever contemplates these portraits with care will view ordinary photographs only for the interest which they may have as likenesses of friends or of people of distinction.

Among the examples of landscape we were attracted by the pleasant rendering, by Mr. J. Brier, of *Pont-y-Pair, Bettws-y-Coed.* Here the boulders which enclose the quiet pool, and the dainty foliage which surrounds it, are exquisitely suggested. Photographers are never more happy than when rendering the charming effects of a shady avenue like Mr. W. Nicholson's view of *Bonchurch Valley and Pond*, in which the nicest gradations of shade are brought out with delicate truth. Photographers revel in ferns and flowers. Mr. J. Brier has met with a marvel of this kind at *Undermount, Bonchurch.*

Architecture is rendered to perfection. Mr. Henry Piper has some views in which buildings are the chief features. His *Warkworth Castle*, with river and woody slope, is fresh and bright as day; his *Guisboro' Abbey, Yorkshire*, is expressed with a sharpness that would almost seem unreal; every stone that goes to make up the venerable pile looks as crisp as the chisel left it. The collection is rich in photographs of famous ruins. Mr. Pendryl Hall has a number from which it would be difficult to select one in preference to the others. The *Courtyard, Acton Burnell Castle*, and *Conway Castle, from Bettws-y-Coed*, are, like *Buildwas Abbey—Nave and Chapter-House*, rendered with feeling.

Colonel H. Dixon exhibits a series of effective views in India, chiefly of famous temples and palaces.

Very much in contrast with the clear atmosphere of Colonel Dixon's Oriental scenes is Mr. Reuben Mitchell's little photograph called *Threatening Storm—On the Road*, which is soft and humid to look upon as an April shower, when white-edged clouds pass swiftly on their way.

Messrs. A. and J. Bool can deal with an entanglement of weeds, plants, and wild flowers, as witness their landscape entitled *A Shady Nook.* For a first-rate true portrait of an old tree commend us to an example in the collection, an enlargement by Edwards's process from a negative by Mr. Henry Cooper. In this instance the lens has done its work in revealing the effects of storm and tempest, wrinkled age, and the havoc made by foolish visitors who from time to time have made incisions in the bark to inscribe their names.

There is a charming bit *On the Cherwell—Early Morning.* Tall, graceful elms, which half conceal a Gothic tower, and a narrow stream well fringed with sedge. It is by Mr. J. Vaughan. Mr. J. Sutcliffe has specimens of soft, dreamy landscapes. One a calm lake scene with graceful trees, light as the birch, drooping over the water. Six *Views near Melton Mowbray*, by Mr. C. A. Ferneley, have the true, ripe, rustic tone so inviting to the wanderer. In the same feeling and a kindred subject is Mr. F. Beasley's valley *At Medenham*, where the church lies half-buried by the near clump of trees.

Scattered about are many examples of the autotype process, by Messrs. Spencer, Sawyer, Bird and Co. We were struck by the wonderful resemblance of nine of these autotype pictures shown in one frame. They are taken from Turner's *Liber Studiorum.* The selection would appear to have been made to show how the varied effects intended by the great original master may be perpetuated by the autotype process. We have morning, sunny and soft, stirring life on the ocean, village calm, and gloom intense, where black clouds hang over a treeless moor. We need not enumerate the variety of good things which are exhibited by Messrs. Spencer, Sawyer, Bird and Co. Under the heading of "photography in the printing-press" are landscapes and portraits alike successfully treated by their process.

Those who delight in portraits will find a variety of all sizes and proportions. The collection includes photographs of almost every known subject, far too numerous to name. An alphabetical list of exhibitors is appended to the catalogue, which will be of service. The Society has done well to provide space for the influx of contributions which have poured in from all quarters, in addition to the contributions of former exhibitors.—*Standard.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 27	Liverpool Amateur	Free Library, William Brown-st.
„ 29	South London	Cambridge Hall, Newman-street.
„ 29	Oldham	Hare and Hounds, Yorkshire-st.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held at the Memorial Hall, on Thursday evening, the 8th instant,—Mr. W. T. Mabley, President, in the chair.

After the routine business had been disposed of, the Secretary read the

ANNUAL REPORT.

YOUR Council, in presenting the nineteenth Annual Report, have to express their great satisfaction at the continued prosperity of the Society.

The proceedings of the past session have been more encouraging than for some years previously. The meetings have not only been more numerously attended, but also more instructively occupied.

It is very gratifying to your Council to be in a position to report a small increase in the number of members. There are 76 against 70 at this time last year. The average attendance at the meetings has been 31½ against 27.

Several papers have been read, and other matters of interest have been contributed For instance:—

Mr. Wade gave an illustration of carbon printing.

Mr. A. Brothers read a paper *On the Sciopticon for Enlarging.*

Mr. M. Noton read a paper *On the Manufacture of Lime Cylinders.*

Mr Brothers exhibited a series of photolithographs of the *Triumphs of Maximilian.* Mr. Brothers also communicated some particulars in reference to the fading of silver prints, and exhibited some examples of a very conclusive character.

Mr. M. Noton read an appendix to his former paper on limes.

Mr. J. Briar read a paper *On the Production of Enlarged Landscape Negatives.*

Mr. Frankland exhibited a number of photographic conveniences.

Mr. M. Noton exhibited a new form of lantern for the lime light.

Mr. Pollitt read a paper *On Enlarged Negatives by the Wet Process.*

The session included two lantern exhibitions. An attempt to resuscitate the outdoor meetings hopelessly failed, and this once-important and enjoyable part of the annual programme may be considered to have had its day.

Your Council are full of hope that the Society has yet a long and useful life before it, and they desire the active co-operation of each and every member to the end that all things may work harmoniously together; that the meetings may not only convey instruction, but give pleasure to the members; that minor difficulties may only precede major triumphs; and that peace and good-will and mutual forbearance may crown all your efforts with well-merited success.

The annual report was accepted, and the Treasurer's accounts passed.

The election of officers for the year was then proceeded with, and resulted as follows:—*President:* Mr. W. T. Mabley.—*Vice-Presidents:*

Rev. Canon Beechey, M.A., Messrs. A. Brothers, F.R.A.S., T. Haywood, G. T. Lund, and M. Noton.—*Council:* Messrs. Jno. Brier, Jun., W. G. Coote, W. Hooper, I. Wade, E. Woodward, J. Warburton, N. Wright, A. Patterson, J. Pollitt, and J. Frankland. — *Treasurer:* Mr. J. H. Young.—*Secretary:* Mr. Chas. Adin, Clifton Bank, Wellington-road, Whalley Range, Manchester.

Mr. Robinson (on behalf of Messrs. Vandyke and Brown, of Liverpool) presented three autotype mechanical prints to the Society.

Mr. Brothers sent several very clever photo-chromolithographs for exhibition, the work of his friend, Mr. Griggs. These were much admired.

Mr. Coote contributed a specimen of his old enemy, marbled plates—this time by the wet process—and a print on paper that had been kept five and a-half months between sheets of blotting-paper saturated with a thirty-grain solution of carbonate of soda, and dried. The print was of fair average quality.

The Chairman read a letter from the Rev. Canon Beechey, M.A., referring to a "sub-leader" in THE BRITISH JOURNAL OF PHOTOGRAPHY, and stating that he had sent the plates to the meeting for the inspection of the members. These plates were examined with much interest.

The thanks of the Society were accorded to Messrs. Vandyke and Brown, Mr. Brothers, and Canon Beechey, and the meeting was then adjourned.

THE PHOTOGRAPHIC ASSOCIATION OF BELGIUM.

ON May 17th of the present year was founded in Brussels the first Belgian Photographic Society, under the title of "*Association Belge de Photographie,*" the objects of this Association being purely artistic and scientific, and having nothing to do with the commercial phase of the art.

The Association is to comprise various sections, or local societies, in the principal towns of Belgium; and already three of these branch societies have been formed, viz., one at Brussels, one at Ghent, and one at Liege, whilst another at Antwerp is in progress of formation.

The President of the general Association is M. G. de Vylder, professor, at Ghent. The two Vice-Presidents are M. Candéze, doctor of medicine, at Ghent, and M. De Blochouse, photographer, at Brussels. There are six gentlemen on the Committee; and there are a Treasurer and a Secretary, the latter being M. A. Rommelaere, chemist, Brussels, No. 41 Rue de Namur.

The Association numbers already about 150 members. It publishes a monthly journal containing a photographic illustration; it appoints committees to investigate various problems and products which may be submitted to it; and it proposes to hold an annual exhibition of photographs.

Corresponding members, who must be foreigners residing abroad, are admitted on payment of a yearly subscription of ten francs and no entrance fee. They must be proposed by two members of the committee. Ordinary members pay an annual subscription of ten francs, which entitles them to a copy of the journal, to a presentation photograph, and to free admission to the exhibition. The president is elected for three years, and is not immediately re-eligible. The vice-presidents are elected for three years, and may be re-elected at the expiration of their term of office. The members of the committee are elected for one year, and are re-eligible. In any town where ten members reside a local branch society may be established. Each of these sections must have its own president and secretary, must hold a monthly meeting, and report its proceedings every month at head quarters. Its internal affairs may be under its own management. Any member of the Association has the right to be present at their meetings.

Such are some of the rules of this new Association; and we beg leave, in publishing them, to suggest to such members of our own Parent Society as may be desirous of remodelling its constitution that they may, perhaps, gather a useful hint or two from their Belgian cousins. But, be that as it may, the new photographic association seems to have been started with much spirit and *éclat*, since it already numbers as many members as our own leading society and publishes its own illustrated journal. One is tempted to ask—Might not a similar "Photographic Association of Great Britain" be established, with a section in each of the large towns of the kingdom? Is such a thing hopelessly impossible, and inconsistent with the peculiar genius of the English people?

BRUSSELS SECTION.

The Brussels Section held its second meeting on August 4th,—the President, M. Cadot, in the chair.

M. Roselle described his dry process, with a preservative made with honey, or dried fruits, and exhibited several fine negatives thus taken. (For a *résumé* of this process see last week's *Foreign Notes and News*, page 499).

M. Falliz recommended balsam of Peru, which had given him in three or four seconds excellent results by a simple development without subsequent intensification.

MM. Delaunoy and Rommelaere spoke in high terms of the dry process of Dr. Candéze, President of the Liege Section.

M. De Walque said that on a recent photographic excursion made by members of that Section three operators had employed the Candéze process, and had succeeded perfectly.

The Secretary then proposed that similar excursions should be made by their own Section for the purpose of testing various new processes and forms of apparatus, which was adopted *nem con.*

Some fine photolithographs by M. Gauthier, a photographer at Namur, were then exhibited, and excited much interest.

GHENT SECTION.

The second meeting of this Section was held on August 11th,—the President, M. Donny, in the chair.

M. Waldack submitted the following question for discussion by a committee:—"Has a greater or less quantity of sulphate of iron in the developer any influence on the time of exposure?"

M. Arents, of Paris—one of the French Committee of the Transit of Venus, now on his road to Japan—described the ingenious photographic apparatus devised by M. Janssen for recording the transit. He promised, for insertion in the *Bulletin* of the Association, a detailed account of the operations on his return from Yokohama.

LIEGE SECTION.

The second meeting of this Section was held on July 11th,—Dr. Candéze, President, in the chair.

The President proposed to organise some photographic excursions in the beautiful environs of the town, where those picturesque rivers—the Ourthe, Meuse, and Vesdre—offer an infinity of fine points of view. The comparison of results obtained by different members would be fruitful of useful observations, and would render service to the cause of photography.

The motion was agreed to, and the first excursion was arranged for August 2nd, when Durbuy and Barvaux would be visited.

M. Renard, the Secretary, suggested to members the importance of copying paintings by the old masters, which frequently escaped the notice of artists and amateurs.

M. Renoz exhibited a photographic photometer, the invention of M. Francois Nagaud, engineer. A description of this instrument will be given in in a future number of the *Bulletin.*

Correspondence.

THE LATENT IMAGE UPON AN ORGANIFIED BROMIDE OF SILVER FILM.

To the EDITORS.

GENTLEMEN,—It gives me much pleasure to reply to the very courteous and reasonable letter of Mr. W. B. Bolton, at page 484, and I only wish that a few more gentlemen of the same standing in our art would also engage in our little controversy, with the view of eliciting the truth on that important subject—the theory of the latent image upon an organified bromide of silver film. But I will not occupy valuable space in referring to past misunderstandings in my discussion with Mr. Bolton. The simplest plan by far will be for me to state my theory over again in terms which will not admit of misapprehension. This can be done in a very few paragraphs; and then, when reference is made to it, it will be found here.

I will begin with the case of a wet or moist film, so that no dispute can arise as to the presence of the atom of water which the theory requires. The case of a dry film can be discussed afterwards. The organic matter, or preservative, I will suppose to be albumen, which will be represented in the formula by "Alb."

The fact which I have to explain will, then, be as follows:—*Un*exposed *un*organified bromide of silver is reduced by the normal alkaline developer, but *un*exposed organified bromide of silver is not. Required to explain why *exposed* organified bromide of silver *is* reduced by that developer, because it is this which constitutes the latent image.

My explanation of the fact is as follows:—When bromide of silver and water are exposed to light both are decomposed, owing to the strong affinity which bromine has for hydrogen under the action of light. Thus, three atoms of bromide of silver part with two atoms of bromine to the two atoms of hydrogen in an atom of water to form hydrobromic acid which escapes; and there remain three atoms of silver, one atom of bromine, and one atom of oxygen. When albumen is present these elements arrange themselves thus, and constitute the latent image:—One atom of silver takes the one atom of bromine to form bromide of silver; and the two remaining atoms of silver combine with the atom of oxygen and the albumen to form organic oxide of silver. If we suppose the bromide and the oxide of silver to combine, the entire compound may be regarded as an organic oxybromide of silver. Thus:—

$$3\,Ag\,Br + H_2\,O + Alb = Ag\,Br,\,Ag_2\,O,\,Alb + 2\,H\,Br.$$

I have now to explain why the latent image, which is the first term of the second member of the above equation, is reduced by the alkaline developer, whilst unexposed organified bromide of silver is not. The reason is this:—There is so strong an affinity between the albumen and the oxide of silver in the latent image that they combine, and the Ag Br being then no longer protected by the albumen is reduced by the developer. As soon as this happens the whole compound takes the dark colour due to a mixture of metallic silver with organic oxide; and it is this which constitutes the blacks of the negative. Why the latent image is colourless is because the colour of the oxide of silver and albumen is masked by the admixture of the bromide of silver.

Now we come to the case of a dry film. The water which my theory requires is, I believe, now obtained from the atmosphere, for the film absorbs it and becomes hygroscopic. We never expose a perfectly dry film which has just been removed from before the fire; if we did we should get but a very imperfect result. The air is loaded with moisture, particularly during the heat of summer. Hold a piece of sensitive albumenised paper, or a sheet of paper from your writing-desk, or a garment from your wardrobe, before the fire, and you will see it steam. There is moisture enough in a dry film to suit my theory. In any other theory it would be unsafe to omit all reference to the atmospheric moisture which the film contains.

The term "preservative" is not an improper one to apply to the organic matter with which the film is coated, because this does, in fact, *preserve* the unexposed bromide of silver from the action of the alkaline developer, which would otherwise reduce it. The preservative is, in reality, a protecting agent, and its office is to keep the lights clean and render development possible. Try to do without it and you will get a mass of fog, unless the collodion itself is strong in its organic reaction with the salts of silver. The term "organifier" is, however, better, because it involves no hypothesis at all.

The reader will bear in mind that the albumen preservative, after it has been allowed to flow over the film, may all be washed off, and its good office will still remain. I imagine that there is an affinity between it and bromide of silver, so that every atom of the latter combines with an atom of albumen. According to this view my formula should contain the term "3 Alb.," instead of "Alb." In the latent image, the Ag_2O will combine with the 3 Alb., and leave the Ag Br alone and unprotected.

It appears, therefore, that an excess of organic matter may be injurious, and, by interfering with the development, may render the film less sensitive. This, I believe, is practically found to be the case. Major Russell used to prefer tannin washed off as more sensitive than tannin left on. THOMAS SUTTON, B.A.

October 17, 1874.

KENNETT'S GELATINO-PELLICLE.

To the EDITORS.

GENTLEMEN,—Your correspondent, Mr. John Vaughan, has, I frankly admit, made a fair catch this time, and is fully entitled to "score one" against me so far as regards my statements about the lens; but I admit my guilt no further.

I ought no doubt to have said "Ross's rapid symmetrical lens, seven-inch focus and $\frac{f}{12}$ stop." As regards the expression, "fairly-lighted landscape at this time of the year," I contend it gives all the information needed—indeed possible, until we get some reliable instrument for indicating the precise condition of actinism at the time in question. I desire to add that I never raised the point whether there are or are not dry processes equally sensitive. I don't gainsay the possibility of such, or institute any comparison. Mr. Vaughan states there are such, and adds, "without the disadvantage attending the use of gelatine." Why disadvantage?—I am, yours, &c., P. LE NEVE FOSTER.

October 20, 1874.

SOUTH LONDON PHOTOGRAPHIC SOCIETY'S TECHNICAL MEETING.

To the EDITORS.

GENTLEMEN,—I see that this meeting is to come off on Thursday next, the 29th inst., and I hope, as the meeting is free to all, that not only the members but other photographers also will contribute from their stores of experience to make the meeting thoroughly useful.

I intend to send something myself of a practical nature, which I have found of advantage in daily working. I trust others will do the same, for we must all help. Almost every man works out something that he feels is an advance on what is in use, and such a meeting permits every one to give and take.

I am glad the meeting, as I see by Mr. Cocking's letters, is to be confined to practical matters. It is not everybody who understands theory, but the details of practice we all know, and want to know more. Some may show an improved dipper that will not allow the plate to slip off, a better kind of bath, a fresh mode of filtering, a new means of preserving sensitised paper, an improved cork, stopper, or dropping-bottle, or a new kind of developer. Speaking of this last I see that some people have recently been recommending the omission of acetic, or any, acid in the developing solution; I should like to see some negatives so taken, as recently I have found the advantage of doubling the quantity of the acetic acid.

If some of those gentlemen who have been successful in shortening the exposure in the camera by the preliminary exposure of the plate to light through opal or coloured glass, or in any other way, would show how they have done it they will render a great service.

I see that short, pithy papers are invited on practical subjects. It strikes me that such short, concentrated articles as appear annually in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC are just the things required for this meeting. Nothing is so interesting as the results of actual practice, especially if confirmed by daily trial. Everybody is obliged to use those ingenious expedients that are disrespectfully called "dodges," and everybody knows their value, or they would not use them. Fresh examples are always occurring, and few things are more interesting to really practical men; therefore, let no false shame stand in the way of exhibiting these examples of ingenuity.

One thing, in conclusion, let me impress on those who attend the meeting, but who will not have contributed anything—that is, to be tolerant to those who do contribute, and to remember in how much higher position everyone will stand who has attempted to help than those who have done nothing.—I am, yours, &c., A MEMBER.

October 22, 1874.

REFINING SILVER.

To the EDITORS.

GENTLEMEN,—In your last issue Mr. Foxlee states in his article on the reduction of residues by what he styles the "wet process" that the silver is recovered as *pure nitrate*. Is not this a mistake?

I remember having read in the Journal a long time back that the nitrate made from silver obtained from old baths, by decomposing the chloride with zinc, contained some chloride in the crystals, which made its presence manifest by giving a milky solution when it was dissolved in water. Further: Mr. Hardwich, in the sixth edition of his work, says that he has found the chloride both before and after its reduction to contain organic matter. Therefore, I inquire if it is not impossible to obtain *pure* nitrate of silver without having recourse to the furnace.—I am, yours, &c., REFINER.

October 19, 1874.

NATIONAL PHOTOGRAPHIC ASSOCIATION FOR GREAT BRITAIN.

To the EDITORS.

GENTLEMEN,—I was much gratified to find, by an article in your last issue, that you advocate the idea of the establishment of a "National Photographic Association for Great Britain." I am perfectly convinced that until something of this sort be established in this country the art will not hold that position in public estimation which it deserves. Such an association would wonderfully strengthen the present local societies, and promote the rapid advancement of the art generally. Some say or think the time is not yet ripe for such a movement; but, in my humble opinion, it should have been started years ago. Old England always takes a long time to consider changes, and, instead of taking the lead of other nations in arts and sciences, has rather been behindhand—evidently so since the death of the lamented Prince Consort.

Your remarks as to the success of the pharmaceutical conferences are very pertinent, and should be seriously weighed by all photographers. There are several thousands of photographers in this little island of ours, and men of remarkable genius are buried away in remote corners. Every now and then a bright star arises suddenly into eminence by some special work of art exhibited at the London annual exhibitions; and, if so, how much more might be gained by holding annual conferences in large populous towns, and interchanging ideas by immediate intercourse with representatives from every society in the kingdom.

I am quite of your opinion with respect to the British Association for the Advancement of Science as being merely a "makeshift," if not worse, for what is really required.

The success of the "National Photographic Association" during the six years of its existence has been most marked, and our American cousins deserve to be complimented upon their enterprising spirit. Although in this country such an association would be conducted on rather a different method, yet many features in the constitution of the National Photographic Association are well worth our consideration and adoption. Trusting you will have many letters upon this subject, so that it may be well ventilated, and hoping it will not all end in talk,—I am, yours, &c., GEO. HOOPER.

68, *Canonbury Park South, N.*,
October 19, 1874.

THE PRICE OF SILVER.

To the EDITORS.

GENTLEMEN,—Having ascertained from your valuable Journal the present very low price of metallic silver, which appears to be nearly fivepence per ounce less than it was a few years back, why should I still have to pay the same price for nitrate of silver as I did then, seeing that it is only a by-product in refining?

I have applied for a reason to my stock-dealer, who assures me that *he* still pays the same price as hitherto for it. This clearly should not be the case.—I am, yours, &c., A LARGE CONSUMER.

London, October 21, 1874.

"WINSTANLEY'S METHOD OF REDUCING THE CAMERA EXPOSURE."

To the Editors.

Gentlemen,—The time-honoured custom of recording discoveries in the anagrammatical form—a custom which was adopted by Kepler and Huyghens, in reference to the physical formation of the planet Saturn—has been again revived in a recent number of your excellent contemporary, *Nature*.

With your permission I beg to place on record in this manner the secret and the theory of my method of reducing the camera exposure. The translation will be given after a reasonable lapse of time:—

$A_5\ B_1\ C_7\ D_8\ E_{14}\ F_6\ G_4\ H_6\ I_{12}\ L_3\ M_3\ N_7\ O_7\ P_2\ Q\ R_5\ S_9\ T_{12}\ U_5$ V X Y.—I am, yours, &c., D. Winstanley.

Blackpool, October 17, 1874.

EXCHANGE COLUMN.

I have a quarter-plate portrait lens, never used, for which I want a second-hand Meagher's half-plate new folding camera.—Address, W. Welford, Bulman Village, Newcastle-on-Tyne.

I will exchange any accessory or apparatus from a well-appointed studio for a cottage window. Send photograph, which will be returned.—Address, E. Dalton, American School of Photography, Chesterfield.

Magic lantern, with 4½ or 4-inch condensers, lime jets, &c., &c., wanted in exchange for 8½ × 6½ and stereo. Kinnear camera, and three dozen 8½ × 6½ glass plates, or walnut revolving stereoscope to hold fifty glass or paper slides.—Address, J. H., 97, Manchester-road, Swinton, near Manchester.

ANSWERS TO CORRESPONDENTS.

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

V. Hatch (Huddersfield).—Received. In our next.

F. H.—The method you suggest for retouching has been long known to photographers.

F. B.—We do not intend, at present, to give an article upon the etching of metallic plates.

Susan.—For your purpose it is advisable to desiccate the albumen. It will then keep good for several years.

The Crawshay Prizes.—We have to acknowledge the receipt of numerous letters in connection with this subject.

G. B. B.—Paint the inside of your box with a mixture of negative varnish or ordinary spirit varnish, and lamp black.

H. D. A.—1. The inventor of the glycerine process was Mr. Fysh.—2. If you address a letter to Mr. Harrison, to our care, we will hand it to him.

Tyro.—Although eighteen feet would answer it will be much better to secure the piece of ground adjoining your present plot, and erect a studio of greater dimensions.

B. J. I.—It would afford us a great deal of pleasure to avail ourselves of your very kind invitation. Should we ever have occasion to visit the island we shall certainly call upon you.

J. E. G. F.—1. Apply a solution of cyanide of potassium containing as much iodine as it can dissolve without discolouration of the solution.—2. Glacial acetic acid is about three times stronger than Beaufoy's.

The Shah.—The precipitation of silver from the addition of nitrate of soda arises from the latter salt being impure. The best published means for producing prints on canvas to be coloured in oil is that so well known as carbon printing.

L. B. A.—You are acting an immoral part in trying to copy your rival's picture. The fact of your merely vignetting the portrait does not render you the less a pirate, and, therefore, amenable to the law. We advise you to abstain from such a course.

Stereo. (Torquay).—Although none of the lenses in their present form will cover the ground glass of either of the two cameras mentioned, yet they will do so, with the exception of the stereo. lens, if the back lens of the combinations be used alone. To cover the plate sharply up to the margin a small stop must, however, be used.

H. D. L.—This correspondent inquires as to the difference between the beer and albumen process introduced by Mr. W. H Davies and the process associated with the name of Captain Abney. We reply that the difference, so far as we can see, consists in a slight variation in the relative proportions of the beer and the albumen used as a preservative.

Capt. Gubbins.—What is meant is doubtless the following:—With a large stop a field of a certain definite size is sharply delineated; in proportion as the stop is reduced so is the area of sharpness extended. In other words, with the largest stop a certain central portion only of the view seen on the ground glass is thoroughly sharp, but with a small stop it is all sharp.

Fred. S. Brown.—Your lens is a good one; but you do not appear to be aware of the fact that depth of definition can only be obtained by the use of diaphragms. Take three pictures of the same subject without moving the camera. Let the first be taken without a diaphragm, the second with one of medium size, and the third with the smallest. Then compare the results.

An Army Surgeon.—This correspondent would feel obliged to any reader kindly giving him some information relative to the state of photographic portraiture, from a professional point of view, in Persia. He can speak the language fluently, and as he can take first-class portraits he wishes to have a hint as to the success likely to probably await him were he to start as a professional photographer in that country.

John M'Laren.—So far as we know, the instantaneous doublet is more rapid than the "symmetrical" lens. Neither of them are suitable for portraits.

Inquirer (Belfast).—A very convenient method by which to see the image non-inverted on the ground glass of the camera is to hinge a mirror to the lower side of the focussing-glass frame, so as to allow it to fall backwards and remain at an angle of forty-five degrees with the ground glass. Now, by looking *down* into this mirror everything depicted upon the focussing-screen will be seen non-inverted, as in nature.

F. Hamblen.—1. Some photographers are pretty prosperous; with others the world does not wag so well. To make such a start as will ensure success you must not only be a good photographer, but also possess a thorough practical knowledge of business, and have a fair amount of capital at your disposal.—2. There are both good and bad vans. We must decline to offer any opinion upon the one you intend to purchase, until some more information has been afforded respecting its construction and design.—3. Photography is not an unhealthy occupation.

Norman.—Your mistake consists in using the Schlippe's salt in an improper manner. Previous to its application the image ought to have been chlorised. This is effected by adding to a solution of bichromate of potash—the exact strength being immaterial—a few drops of hydrochloric acid, and pouring this over the negative after it has been fixed and washed. In a few minutes the image will have assumed a beautiful pearly-white tone, at which stage it must be washed. The solution of Schlippe's salt may now be applied, the result being the conversion of the image into an intense scarlet colour.

S. H. F.—1. If by curtains you mean "blinds," then calico *is* a suitable material; but if, on the other hand, you really mean curtains or heavy drapery as accessories then you will find silk the best, although either a velvet or a woollen fabric is frequently used with excellent effect.—2. The best colour for the interior of your studio is French grey, which will not dazzle the eyes of sitters.—3. Old collodion answers well for cleaning new glass plates.—4. Mr. England's method of washing prints is an excellent one.—5. To register two pictures the fee for two must be sent; there is no reduction made for quantities.

An Amateur (Twickenham).—1. The object of adding alcohol to the nitrate bath is to assist in effecting the coagulation of the albumen, and thereby obtaining brilliant tones with a tolerably weak sensitising bath. Alcohol coagulates albumen, and so does a strong solution of nitrate of silver; water dissolves it.—2. You will be enabled to decide the question as to the relative merits of the long floating on a weak bath and the shorter floating on the strong bath by making a few experiments. Be guided solely by the results you obtain, and give no consideration to the economy of either method, as the difference in cost will eventually be comparatively *nil*.—3. To obtain the brown tones you speak of tone lightly, using an acetate bath.

Decease of a Notable Man.—Mr. Henry Langdon Childe, who was known to a previous generation as the inventor of dissolving views, died a few days ago at Mostyn-road, Brixton, in his 93rd year.

South London Photographic Society.—The first meeting of this Society, for the winter session, will take place on Thursday next, the 29th instant, at seven o'clock, when its annual Technical Exhibition will be held, to which all who are interested will have free admission. We are requested to state that all objects for exhibition have to be sent to the place of meeting, Cambridge Hall, Newman-street, on the *day of meeting*, October 29th—*not* the 28th, as was announced in our issue of last week.

LONDON GAZETTE, *Tuesday, October* 20, 1874.

Partnership Dissolved.

Bank Scott & Co., Birmingham, photographers.

METEOROLOGICAL REPORT,

For the Weeks ending October 21, 1874.

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

These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
8	29·95	WNW	43	44	56	38	Fine
9	29·91	SW	51	55	59	39	Dull
10	30·15	W	50	50	63	42	Cloudy
12	30·24	SW	53	54	63	48	Dull
13	30·00	SE	54	56	66	49	Dull
14	29·96	SE	53	55	—	50	Dull
15	29·56	S	58	59	66	50	Raining
16	29·73	SE	57	58	60	51	Dull
17	29·95	W	57	58	62	51	Fine
19	29·94	WSW	53	55	61	46	Raining
20	30·27	W	43	44	57	38	Fine
21	29·78	SW	52	52	—	39	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 756. Vol. XXI.—OCTOBER 30, 1874.

"POP-GUNS."

Valuable goods are often made up in very small parcels. Quantity is not necessarily always inseparably associated with quality, and a well-directed bullet of the tiniest dimensions may kill even a big man quite as thoroughly as the projectile from a field-piece. The members of the Amateur Field Club are a good-natured set of men, and they will smile at seeing the apparatus commonly used by them designated as "pop-guns" by a writer in our last number.

Knowing something about the Club mentioned, and the apparatus of those who form it, we may here observe that in the list of its members are to be found some who are recognised as among the foremost photographers in the world, the apparatus used by them being the best that optical skill can devise or money procure.

"Pop-gun" photography forms a fertile theme for comment. Before, however, we can indulge in such discussion it is imperative that some kind of definition of the term be determined upon. This will not prove a difficult task, seeing the expression has been used in connection with the apparatus used by an existing body of photographers. The average size of the cameras used by the Field Club when engaged in their "field operations" may fairly be put down as not exceeding eight inches, 8 × 5 being a favourite size with many, although in some instances these dimensions are exceeded. The question here arises—What has been or may be done on an 8 × 5 plate?

In the first place, those beautiful works of Mr. R. Manners Gordon which have proved a source of delight to so many are of smaller size than that mentioned. Upon measuring a negative in our possession, taken by this gentleman by his unpublished dry process, we find it to be 7¼ × 5¼. Then, again, those gems of Scottish scenery, by Mr. G. W. Wilson, which prove such an attractive feature in the Photographic Society's Exhibition, are all of dimensions which no one would venture to describe as otherwise than small. From these, as well as numerous other examples which might be cited, we are safe in arriving at the conclusion that, by means of "pop-gun" cameras, may be "bagged" the finest pictorial gems that could be desired by the most fastidious taste.

As respects convenience cameras of small size are infinitely preferable to larger ones. Light, compact, and portable, the case containing the camera may be carried by the nomadic photographer in one hand, the camera-stand in the other, and the satchel containing three or four double backs filled with plates slung over the shoulder. This, of course, implies that a dry process is employed. Equally portable is the *impedimenta* for working with wet collodion. When plates of small dimensions are being used the covering power, depth, and general definition of the small lenses employed will be found rather better than in those of large size; hence arises the fact —soon to be as well recognised in connection with landscape work as it has for a considerable time been in portraiture—that a *better* large picture can be secured by the production of an enlargement from a small one than by the taking of a large picture direct. Indeed, the very enlarged landscapes which have elicited the marked approval of "A Visitor" as having been produced by Mr. B. J. Edwards from negatives by Mr. Henry Cooper owe their existence—may we not say their excellence?—to the circumstance of their being "pop-gun" productions.

As small portraits form the best stepping-stone to the production of those of large size, so will it be the case with landscapes. There are none of the "pop-gun" class of negatives we have seen that will not bear enlarging four times linear without coarseness or texture being made apparent. But if the degree of amplification be only three instead of four times, still a very excellent degree of enlargement is obtained, a 7 × 5 negative yielding a sharp picture one foot nine inches by one foot three inches. As the means by which so desirable an end may be secured the pop-gun instrument commands the highest respect. The negatives being perfect the results are faultless when enlarged to whole-sheet dimensions. Camera-makers and opticians have put forth every effort to have such portable apparatus so constructed as to combine the utmost compactness, steadiness, and efficiency the existing state of mechanical and optical science is capable of presenting, and in this they have achieved a remarkable degree of success. If photographers—more especially amateurs—confine themselves to this class of instrument they will find in the portability of the outfit and the excellent results secured an effective set-off against mere size.

We embrace this opportunity of giving the brief details of an excellent method by which enlarged negatives may be made from small ones on paper, from which, in turn, may be obtained large prints in the printing-frame. The method is not quite new, but although Mr. Solomon, in the last edition of his pamphlet, has described it very nearly as we have seen it practised, there may be many who are yet unacquainted with the process, which is as follows:—

The first thing to be done is to obtain a good transparency by superposition, which is now very easily done. This is placed against the sky in the open end of a copying camera, and an enlarged image is thrown upon a sheet of paper salted by being immersed in the following solution:—

Iodide of potassium	80 grains.
Bromide of ammonium	85 „
Chloride of ammonium	10 „
Gelatine	60 „
Albumen	1 ounce.
Water	10 ounces.

Mix, and after the gelatine has become swollen and soft apply heat to complete the dissolution. Paper so prepared can be kept in a dry place ready for use. It is excited on a bath composed of—

Nitrate of silver	1 ounce.
Glacial acetic acid	¼ „
Water	12 ounces.

It is exposed wet, and developed by a three-grain solution of gallic acid containing a grain of acetate of lead to each ounce of water.

A negative obtained in this manner produces good prints upon either plain or albumenised paper, although they are a little inferior in delicacy to prints obtained from collodion negatives.

It is worthy of notice that, instead of treating the paper by the mode just directed, it may be sensitised at one operation by applying to plain paper either collodio-bromide or gelatino-bromide of silver.

The development of these paper negatives is effected by laying the sheet of paper upon a clean board previously covered with a sheet of bibulous paper, then bending up the margins of the sensitive sheet slightly and pouring in a little of the developer, which must be spread all over by means of a glass rod.

ON DUPLICATING NEGATIVES.

The short note of Mr. Russell Sedgfield, in our issue of last week, recals a statement we have made more than once, *i.e.*, that photographers are at once the most credulous and the most unbelieving of men. Their credulity is amply shown in the ready support which the vendor of a secret process meets, especially if his statements are made with the necessary plausibility and force; and their unbelief is equally manifest in the difficulty which is found in inducing them to "take kindly" to many most valuable suggestions the adoption of which would lessen their labour, increase their income, and, in many instances, enable them to turn out much better work.

Mr. Sedgfield's article suggests a case in point, and we gladly take the opportunity of pressing it strongly on the attention of our readers. He tells us that he has several negatives which have been in almost constant use for twelve or fifteen years, and that, as they could not now be replaced, he is unwilling to run the risk of spoiling them. We should think so, but at the same time venture to ask the question —Is he not running this risk every day? and, also, Is there any necessity for the continuation of such a dangerous practice? We think not. Some negatives are worth more than their weight in gold, and should only be used to produce the means by which prints can be made. In other words, in all cases where many prints are likely to be required, or where the negative from any other cause is likely to be of more than ordinary value, a duplicate of it should be made for printing purposes, and the original carefully stored away in case of accident.

We are quite aware of the usual reply to this recommendation— that it is difficult, if not impossible, to make a duplicate equal to the original; but we believe such an opinion is only held by those who have never tried it, or who have made the attempt without mastering the details of the manipulation, as we are quite certain that not only may negatives quite equal to the original be reproduced, but in many cases the original may be very much improved upon.

There are several well-known methods by which such duplicates may be produced. Each operator should select the one he can most conveniently work; but there is certainly none better than the powder process, recently brought prominently before the public by Herr Obernetter. We recommend this process specially, because by it any degree of density may be obtained altogether irrespective of that possessed by the original negative, and because we have ourselves both made and seen made by others, with the greatest ease and in a very short time, duplicate negatives which gave much better prints than could be produced from the original.

There is one slight drawback to the process which has occurred in our own practice, and which has frequently been complained of by others. It is a tendency to pinholes, which frequently appear in the dense parts of the film, and which require sometimes a considerable amount of work to obliterate. This is, however, readily prevented by a little attention to details. If the sensitised dextrine be poured on a cold plate, and carefully watched for a short time, small air-bubbles will be seen to form. After a while they burst, and the film apparently settles down all right; but, in reality, each such air-bubble becomes in the negative a larger or smaller pinhole. By adopting the following precautions we have entirely obviated the difficulty:—

The plate is first coated with a tough, plain collodion, and when set is washed in a dish of water till greasiness disappears. It is then plunged into hot water, taken out and drained, and while still moist and warm the sensitised dextrine is applied. The dextrine solution "fraternises" with the warm, moist surface, there is no appearance of air-bubbles, and consequently no trace of the objectionable pinholes.

For the production of a negative by the powder process no intermediate positive is, of course, necessary; but, nevertheless, we would recommend, in all cases where a negative is likely to be of much value, that a positive should be made from it, as in that case, whatever might happen to original or duplicate, the means of reproduction would always be at hand. Of all the methods proposed for the production of the glass positive or transparency there is nothing superior to the albumen process, properly worked. An excellent method has been more than once published in our columns; but we append a synopsis of it. The plate is coated with iodised collodion as a substratum, which is then washed in several changes of water, and, while still wet, coated with prepared albumen, which is made as follows:—Five ounces of albumen, two drachms of water, and twenty drops of glacial acetic acid are thoroughly beaten up, and, after settling, strained through a suitable filter. To this is then added thirty drops of strong ammonia, or sufficient to neutralise the acid. Next dissolve thirty grains of iodide of ammonium and six grains of bromide of ammonium in two or three drachms of water filter, and add it to the albumen. The plate, after being coated with the albumen, is allowed to dry spontaneously, and when quite dry is sensitised in an aceto-nitrate bath. It is then thoroughly washed and dried, after which it is ready for printing under the negative in the ordinary way, the exposure being considerably over that required for wet collodion.

The development is effected by acid pyrogallic acid and silver, and the film is so hard that any stains which appear may be rubbed off by a tuft of cotton wool. The fixing is done in the old "fixing and toning bath" of hypo. and gold, which at the same time gives the image a fine purple or purple-brown colour, and as a transparency, whether for exhibition or reproduction, it leaves nothing to be desired. The positive thus obtained is ready for the production of a duplicate negative, and the mere fact of its possession will give comfort and confidence to the photographer who, in the course of his business, has to print from negatives of great value, and which could not be again obtained in any other way.

PANORAMIC PHOTOGRAPHY.

It is hardly consistent with the present state of photography that a panoramic picture of any subject should be presented in the form of a number of separate views pieced together by the edges, the lighting being managed in such a manner as to cause a falling off at the place of juncture. In the exhibition of the Photographic Society, now open, there is one view of this description which arrests attention owing to the defect to which we have alluded. If a camera be carefully levelled upon a stand on which it can rotate it is evident that a series of views may be obtained, by rotating the camera a few degrees between each, that shall piece or join together in a perfect manner so far as the mere drawing is concerned, the "omega" of one corresponding precisely to the "alpha" of that which immediately follows.

But perfection in the drawing and the exactness of the coincidence of parts at the point of junction form a portion only of what is necessary in a panoramic picture composed of several parts. An unbroken uniformity of lighting from end to end is also required, and so is uniformity in the perspective. A proper panoramic view being taken in what is known as "panoramic perspective" cannot be properly imitated by joining together a series of views each of which is taken in plane perspective. Either of these two kinds of projection may be allowed, but not both. However, in undulating scenery this is scarcely noticeable.

We can speak from experience as to the excellence of the following method of taking a panoramic view of such dimensions as may be considered at least respectable, and in correct panoramic perspective. It is based on an observation we once made when subjecting a view taken by a pantascopic or revolving camera to a high degree of magnifying power. Finding that it bore a power of six times linear without showing signs of falling off in the definition, we selected a small portion of the negative and produced an enlargement from it to the above extent of amplification; and the definition in the enlargement was still excellent. Now, as a pantascopic-camera view differs from that obtained in the ordinary camera as respects the whole picture from end to end being produced by the axial rays of the lens, no oblique rays being used except for the sky and the foreground, it follows that there is quite as great a degree of sharpness at the extreme end of the negative as there is at the centre; hence the degradation of sharpness apparent towards the sides of pictures taken in plane perspective is not found in a picture of this description. A pantascopic negative, therefore, of 8 × 5 inches is capable, if well taken, of yielding an enlarged panoramic view four feet in length by such an amount of width, or height, as taste may dictate, for a considerable amount of the picture can be cut away so as to reduce the foreground. A finished picture, for framing, of four feet by ten or twelve inches forms an agreeable proportion for a panoramic picture.

To produce an enlarged negative of this size is not at present the difficult matter it was at a former period. From a transparency placed in the copying camera an image is projected either upon a collodionised glass plate or upon sensitive negative paper as described in another article. We may here say that the manipulation of a negative four feet by one foot need not now be attended with much difficulty; for, by making collodio-bromide according to the directions given by Mr. W. B. Bolton in a former number of this Journal, neither silver bath, preservatives, nor washing trays are necessarily required.

When, from the absence of a pantascopic camera, the method described cannot be utilised, and the panorama must be taken by a series of different views one after the other, the wisest course is not to attempt the junction of the pictures, but to mount them upon linen or other flexible material a little distance apart from each other, so as to permit of the series being folded up. Many photographic publishers are now adopting this system in issuing a series of views of particular localities, the views in such cases not having a panoramic relation to each other; and we have reviewed pictures of Scottish scenery in these pages by Wilson, Valentine, and others bound in this form. In this way a merit is made of necessity; the photographer gets all the credit of having produced a panoramic picture without jeopardising—nay ruining—his reputation, and losing his time in joining them together in the vain hope that the junction will escape observation.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

[Third Notice.]

Mr. F. M. Sutcliffe fulfils the expectations we formed twelve months ago, and sends some charming pictures, *An Autumn Sunset* (No. 117) being an excellent example. Its companion (No. 118) is scarcely inferior.

Passing several fine pictures, by Messrs. Akhurst, Dew, S. and E. White, we come to a most pretentious *Panoramic View of Llandudno*, by Mr. A. Ford Smith, which in its present form is, we think, a mistake, and this for reasons which we do not stop here to give, having dealt with them *in extenso* in a separate article in the present number. We merely add that the six pictures forming the panorama are not sufficiently joined to prevent the line of junction being noticed from a distance, by which the effect is marred.

Many of the pictures exhibited by Mr. Pendryl Hall are very excellent. This artist has adopted the plan of intimating upon each picture the character of lens and the size of stop by which it was taken, from which we infer that he wishes them to be specially examined from what we may term the optical point of view. To those who are unacquainted with the relative foci and apertures in the stops of the lenses used by Mr. Hall the descriptions given still leave room for more information.

Two pictures by Mr. Bruce—*Biding His Time* (No. 155) and *Thinking of Home* (No. 156)—are both well conceived and well executed. The former represents an ancient dame, the latter a sailor writing home. Of two clever pictures by Mr. H. G. Cocking, one of a fishwife, entitled *Buy My Caller Herrin'* (164), is the most attractive. Six interiors and views by Mr. G. H. Dunmore are very successful. One of the interiors is a difficult subject skilfully managed.

On the merits of Mrs. Cameron's pictures there are, as usual, conflicting opinions; but no one will deny to this lady her claims to originality in the selection of the titles bestowed upon her works.

It would require much more time than the visitor could conveniently bestow to study in detail all the pictures in the room. Those who can afford sufficient time will find among the continental views much to interest them, and especially among such works the series of twenty-four views in the Province of Asturias (N. Spain) by Messrs. M'Andrew and Stenning.

Mr. Werge exhibits a considerable collection of children's portraits, principally nude, which have been enlarged from *carte* size. Much originality and variety in the posing have been displayed.

There is an excellent pseudo-moonlight picture by Mr. A. Johnston, entitled *Moonlight at Sea* (No. 210*), and an interesting and varied collection of views by Messrs. M. Whiting, W. G. Hunter, J. A. C. Branfill, and W. Wainwright.

Messrs. Jabez and Alfred Hughes exhibit a magnificent collection of photographs of yachts, which are excellent as pictures and must prove invaluable as studies. The taking of such subjects with all the requisite sharpness necessitates an exposure quite as rapid as that required for a restless baby or for one of the denizens of the Zoological Gardens. But the finest of the pictures exhibited by Messrs. Hughes is, with one exception, a transfer collodion enlargement of *Mother and Child* (No. 167). This picture should be carefully studied by those who are desirous of seeing what may be effected in the way of tone and gradation in a collodion enlargement. The "exception" to which we have referred is an enlargement of a similar kind—a lady, forming the centrepiece in Messrs. Hughes's frame, numbered 364, in the small room, and which we believe to be one of the best portrait enlargements in the exhibition.

There is a charming picture—a portrait of a boy standing on a chair (No. 52)—by Hugo Theile, of Dresden, which the visitor must on no account fail to examine. As respects delicacy of manipulation, complete management of light and shade, and perfection of tone, this picture is certainly in no respect inferior to any portrait publicly exhibited in London—at least at the exhibitions of the Photographic Society. Why was this gem not placed in a more conspicuous position?

We shall resume our notice next week.

In the course of conversation with the veteran artist, Mr. Henry Collen, in the autumn of 1865, he described to us the principles upon which, in his estimation, photographs could be produced in the colours of nature. The description appeared to us so valuable that at our request he gave it to our readers in the form of a short article, which will be found in the number for October 27th in the year mentioned, under the heading of *Natural Colour in Photography*. It is interesting to examine and compare the method of M. Ducos du Hauron, described in our *Foreign Notes and News* in the present number, with the principles so clearly laid down by Mr. Collen. His directions were to obtain three negatives, each containing the blue, red, and yellow in the natural object to be represented. From these negatives prints were to be obtained upon coloured materials, the yellow negative producing the print on the yellow pigment, the blue being used on the blue, and soforth. And if, said Mr. Collen, these three positives "be then laid the one on the other with true coincidence as to the form, and all laid upon a white surface, it will not be difficult to imagine that the effect would be not only the representation of the form of the object, but that of its colour also in all its compounds." Mr. Collen significantly adds that although, on the one hand, his idea may be worthless, it may, on the other hand, "contain a germ which may grow and bear fruit in due season." The method carried out in practice by M. Ducos du Hauron is strictly based on these principles.

MR. E. DUNMORE'S ACID DEVELOPER.

In publishing a formula for which special qualities are claimed, however satisfactory the results may be to those accustomed to its use, the details of a few comparative experiments may be acceptable to those to whom the combination is a novelty or a variation on the usual style of development.

On referring to the formula appended it will be seen that the substances used are familiar to all photographers, and usually contained amongst the working material of their laboratories. The novelty consists in the relative proportion which the ingredients used bear to each other; and the advantages claimed for it are a better quality of negative, extra strength and adhesiveness of film, no re-intensifying, and the possibility of developing a passable negative from a plate so much under-exposed as to be utterly useless if developed by the ordinary kind of developer. These remarks apply specially to portraiture. In cases of reproduction, where perfect opacity and clear glass are required, the usual methods of strengthening may be resorted to. For landscape work equal parts of this developer and water will be found good working proportions.

The first series of experiments embraced a large number of negatives taken under the usual varying conditions of studio work, developed with the ordinary developer (Edwards's published formula), and compared with the same number of negatives taken under similar varying conditions and developed with the acid developer. The comparison resulted so much in favour of the acid plan that the old plan was relinquished entirely both for instantaneous and ordinary work.

Special experiments were then made with new and old baths, good and bad light, and long and short exposures upon objects with great contrasts of colour and objects with little contrast.

Series No. 1.—Bath used, thirty-five grains to the ounce, and the light equal and good.—In all these experiments the image came out rather slower with the acid developer than with the ordinary kind, required no intensification, and in all cases the negatives were good. With the ordinary developer the image flashed out at once, and soon attained printing density without re-intensifying; except in a few cases the negatives, although good, were inferior in delicacy to those which were developed with acid. The plates experimented with were scratched with a diamond previous to collodionising, and broken after exposure, each half being developed with a different developer. The collodion (Mawson's) was poured off at the bottom of the plate to equalise the thickness of the collodion at each end.

Series No. 2.—Bath as before; light bad; exposure considered correct.—With acid developer the half negatives were all good, and required no intensifying. With the ordinary developer all required intensifying; then printed fairly well.

Series No. 3.—Old bath, sunned once, and strengthened several times; proper estimated exposure; bad light.—The acid developer gave results precisely similar to those in the case of the experiments No. 2. With the ordinary developer the results were slightly inferior to those in the series of experiments No. 2.

Series No. 4.—Old bath, as in No. 3; exposure half of the estimated proper time.—With the acid developer the image was longer in coming out, the result being a fairly good negative. With the ordinary developer the light parts of the subject flashed out tolerably quick, but no detail could be forced out in the deepest shadows without a little fog.

Series No. 5.—Bath as in No. 1, and the exposure about a fourth of estimated proper time.—The acid developer brought out an image very slowly, with little or no printing detail in the deepest shadows. This was a scarcely passable negative. With the ordinary developer only the highest lights could be seen by transmitted light, the negative being useless for printing purposes, and by reflected light like a very under-exposed positive.

In using this developer it is necessary to remove air-bubbles (if there be any) from the surface before pouring on the plate, they being very persistent, and causing marks on the negative. The developer should be made a day or two before use and then filtered. A flocculent precipitate will gradually form for about a week, after which it will remain perfectly clear and good for many months. After the first filtration a slight turbidity is of no consequence whatever.

FORMULA.

Lump sugar	3 ounces.
Double sulphate of iron and ammonia	3 „
Hot soft water	2 pints.
Dissolve and let cool, then add—	
Beaufoy's acetic acid	24 ounces.
Prepared albumen	2½ „

Mix. EDWARD DUNMORE.

ON PHOTOGRAPHING MOUNTAIN AND MARINE SCENERY.

I am writing these lines in the midst of some of the grandest scenery in Great Britain, and of that class which suggests naturally enough to a photographer a variety of questions relating to the taking of landscapes, for it is precisely such as has hitherto defied all the resources of optics and chemistry applied to the invention of Baptista Porta. The pencil of a Turner or a Cooke might reproduce it to perfection; but, for reasons with which we are all unfortunately but too familiar, the ordinary appliances and processes of the photographic artist are scarcely equal to the task. Photography can deal most successfully with the beautiful, but it seems to break down when the camera is pointed to the sublime. Mountains are dwarfed; skies will not combine with the rest of the landscape; and the toppling wave and dancing ripple have hitherto been but imperfectly rendered in a photograph.

The spot from which I am dating these lines is upon the beach of Cardigan Bay, about a mile westward of the little town of Pwllheli. Before me lies the raging ocean lashed into fury by a howling tempest from the north-west. The cloud scenery is scarcely less sublime than that of the waste of waters, huge dark masses of cumulus chasing each other swiftly across the sky, but showing through their rifts patches of blue, or bright spaces through which the solar rays dart obliquely and shed a glow upon the roaring surf. The gale is a little off shore, and rollers breast high and many hundred yards in length come tumbling in one over the other, and as they break their crests are driven back in whisks of foam, like the manes of a troop of white chargers. To the eastward stretches a fine range of mountains, including Snowdon, Cader-Idris, and Plinlimmon, of most varied outline, now looming through the mist, and now lighted up clearly by a passing gleam. The western side of this fine bay ends in the little islands of St. Tudwall, whilst at the back may be seen the Rivals (reminding one strongly of Vesuvius) and other mountains bearing unfamiliar Welsh names, with which I will not now trouble the reader. Here, then, is a bay possessing in many of its natural features some similarity to the far-famed bay of Naples, and fairly to be compared with it in width and the height of the surrounding mountains, all of which are about the same in both cases, both bays being about thirty miles wide, and the mountain ranges about from two to three thousand feet high.

But it is not in stormy weather only that I have had the opportunity of admiring what is probably the finest bay in the British islands. I have spent about ten days here, and have witnessed its varied charms under the pleasing aspects of calm and sunshine, by the light of the silver moon, and also at sunrise nearly every morning. Such scenes must of necessity be suggestive to a photographer, and I will now venture to offer a few remarks respecting the best mode of turning them to account with the camera.

The main difficulty which seems to lie in our way in photographing scenery of this kind with our common wet collodion process is that the sky and distant mountain ranges, together with the breaking waves, might be taken instantaneously but for the increased exposure required for dark foreground objects, and the fact of our rapid lenses with large aperture only covering a narrow angle of view with good definition. The former part of this difficulty may be met, to some extent, by double printing from two negatives—one including the sky, &c., taken instantaneously, the other including the dark foreground objects. And here I may observe that, in taking a pair of negatives of this sort for any kind of natural scenery including a sky and distance, it is well to expose one of them with reference to the sky and distance only, leaving the foreground to take care of itself, and to expose the other for the deep foreground shadows only, leaving the rest to chance; then, in the double printing, to let the middle distance in both negatives combine the best we can, and not block it out altogether in either of the negatives. In this way hard lines will be avoided, and the deception will be more complete.

With respect to the optical difficulty of including a wide angle of view—say from sixty to ninety degrees—instantaneously, this might be met by working upon cylindrical glasses, with a portrait lens fixed in a revolving tube, something like that employed by Mr. Martin in the early days of the daguerreotype process. I am convinced, from hundreds of experiments, that no skilful photographer will find any difficulty in working upon curved glasses. When the right way of coating and developing glasses of this sort has been pointed out, he will find the manipulation of them just as easy as that of flat plates. I once collodionised a very large curved glass, measuring about 20 × 9 inches, quite successfully in the presence of Colonel Stuart Wortley and Mr. R. M. Gordon, and both gentlemen were convinced at once of the practicability of this mode of working. The difficulty does not lie with the photographer, but with the optician, who may, perhaps, be puzzled to make the kind of apparatus which I suggest sufficiently accurate for lenses with large aperture.

A view including about forty-five degrees of angle might be taken instantaneously upon a curved glass shaped like a watch glass, and the negative could then be copied in a suitable copying camera. Watch-glass-shaped negatives will offer some conveniences. For instance, they may be laid face downwards upon a table without being scratched; they may be packed one against another in boxes without grooves; they will hold the developer without running off; and they may be easily levelled upon the top of a tumbler, wine glass, or round basin during the development. Dry glasses prepared in this way might be left longer with the preservative in them so as to saturate the film; and whilst drying they might be placed face downwards so as not readily to contract dust. In short, it is quite within the bounds of possibility that curved glasses may be found *more* easy to manipulate, on the whole, than flat plates. When of the cylindrical form they can be printed from in the shade quite as easily as flat negatives; and when of the watch-glass form they positively offer an advantage, optically, for copying in the camera, because their margins will approach nearer to the lens than the margins of a flat plate, and will therefore give a flatter field and better marginal definition in the print.

The kind of scenery which I am now discussing in its bearing upon photography will involve another difficulty, which, however, can be easily met. It will sometimes, and probably often, happen that only a very small angle of view will be included, the distant objects being magnified so as to fill the plate by means of a lens of very long focus. I have already seen many charming "bits" of distance in this neighbourhood which may be taken upon plates of the cabinet size by means of lenses of from three to six feet focus; in fact, with telescopes fitted with a dark slide, and used with the object-glass having its full aperture and no stop. But this would involve the following difficulty, viz., that when the camera is very long in proportion to its other dimensions its sides reflect internally so much light as seriously to fog the image. Everyone who has directed a common astronomical telescope to near terrestrial objects—say at a hundred yards distance—which include a little dark foliage with a strip of sky, must have observed how very much the shadows of the dark foliage are dimmed and fogged by diffused light; that is to say, by light reflected from the inside of the tube of the instrument, no matter how it may have been blackened. But this is only an exaggeration of what happens in our common short cameras, where the lens or window is small in proportion to the size of the plate. The remedy for this evil in very long cameras, where the lens is nearly as large as the plate, will be to fit the inside of the camera with a series of diaphragms placed at regular distances and gradually increasing in the size of their aperture as they approach the plate. The sides of the camera will not then reflect any light upon the plate. It may not be generally known, but it is nevertheless a fact, that a bellows camera will give brighter negatives than one having flat sides.

Another point to attend to in these long cameras is that the lens should be made larger than is optically necessary, and its edge should be screened by an annulus of metal, so as to stop all reflected light from the interior of the glass at the circumference.

THOMAS SUTTON, B.A.

FOREIGN NOTES AND NEWS.

PROCESS OF M. DUCOS DU HAURON.—PHOTOGRAPHY AT THE FRENCH MINISTRY OF WAR.

M. DUCOS DU HAURON has addressed an interesting letter respecting his process of photopolychromy to the President of the Photographic Society of France, accompanied by two specimens which are spoken of as good by a competent judge. In this letter the author gives a description of his process, which we will endeavour to sum up.

In the specimens alluded to the result is produced by means of three colours only, and their admixture by overlapping, viz., red, blue, and yellow. Thus, the camera being directed to a coloured object, a negative is taken with a green glass before the lens; then a second negative with an orange glass; and, lastly, a third negative with a violet glass before the lens. From these three negatives three prints are printed upon glass by the autotype process—one by means of a pigmented paper of the colour of carmine; another by means of a pigmented paper prepared with a mixture of cadmium yellow and Indian yellow; and a third with a mixture of Prussian blue slightly tinted with carmine. Having thus obtained these three coloured prints upon three separate glasses the yellow print is first transferred from the glass to a sheet of paper; then the red print to the same sheet of paper, by superposition upon the yellow print, carefully preserving the register; and, lastly, the blue print. These three coloured prints, thus combined, produce the final print in polychrome, which exhibits, by the overlapping of the colours, a variety of different shades and tints.

In taking the three negatives the common wet collodion process was employed, and a difficulty was at first experienced in working with an orange-coloured glass before the lens, owing to the great length of exposure required. But this difficulty was met in a very ingenious way, viz., by immersing the plate in a much weaker nitrate bath than that in which it had been excited. Although this at first diminished the sensitiveness of the plate, yet, as the trace of free nitrate in the film became concentrated by drying, the sensitiveness of the plate increased towards the end of the exposure, without introducing any of those evils attendant on the rapid formation of iodo-nitrate of silver. It is only necessary to add that the collodion used was coloured by an admixture of coralline.

M. Ducos du Hauron's method of transferring his coloured prints from their provisional support upon glass to their final support upon paper seems to be difficult and tedious when compared with the method of printing by double transfers which is employed by the Autotype Company, and is as follows:—The print upon glass is first coated with gelatine and allowed to get dry. The glass plate with the image thus gelatinised is then immersed for a few seconds in a solution of gelatine containing seven or eight grammes to the litre. This solution is too weak to gelatinise on cooling. A sheet of gelatinised paper—being that which is to serve for the final support of the prints—is then immersed in the same bath, gelatine side downwards, for one or two minutes. Next, the plate with the print upon it is immersed also—the paper and the print being in contact—and the two are withdrawn from the bath together, adhering closely without the aid of a squeegee. They are then left to drain and get perfectly dry, when the adherence between the two will be quite complete; after which the glass plate is put again into the same weak bath of gelatine and left for about an hour. It may then be withdrawn, and the paper removed from the glass by passing a penknife round the edges, when the image will be perfectly transferred to the paper and the glass left quite clean. Our author recommends that a little bichromate of potash be added to the gelatine with which the print upon the glass is first coated, and that it be exposed to the light in order to harden it.

On the 7th instant the officer-pupils of the "Ecole d'Application d'Etat-Major," conducted by their professors, visited the photographic *atelier* at the Ministry of War. During the visit, which lasted four hours, these young students were shown how the lessons which they had received at the "Ecole" were put in practice on a large scale in the various processes of copying, of photolithography, and heliography. M. Duras, who is at the head of this establishment, has just been promoted to the grade of "*chef d'escadron*," as a reward for his important services.

NOTES FROM THE NORTH.

IN a former batch of *Notes* I described a very convenient form of developing-stand which I had seen while on a visit to Mr. Gartshore, of Ravelston. Messrs. Kemp and Co., of Edinburgh, ever alive to anything that may be of use to their *clientèle*, have somewhat improved upon this stand, and introduced it as "the Gartshore developing-stand." The annexed wood-cut will, without any explanation, show the nature of this very handy addition to our stock of apparatus.

Somebody, in a recent number of the Journal, has recommended Bath brick as an excellent material for roughening the varnish of a negative previous to retouching; and a capital thing it is, only he did not know how best to apply it, as, if scraped down with a knife as he advised, it is almost certain to be so gritty as to scratch the varnish. While interviewing Mr. J. M. Turnbull, who is always up to some useful dodge, and who deserves much credit for doing really excellent work in the very worst and most unsuitable studio I have ever seen, he showed me his method of employing the Bath brick. It consists simply in lightly drawing the middle finger across the surface of the brick, and then rubbing it with a circular motion on the parts intended to be retouched. By this means only an almost impalpable powder is applied, which, while it cannot do any injury to the varnish, gives it a surface as easily marked by the pencil as ordinary paper; and, what is of nearly as much importance, if the retoucher should be dissatisfied with his work, a very slight rub with the finger, drawn across the brick as before, will remove every trace of pencil marking, and leave the surface ready for a fresh application.

Mr. Turnbull also showed me a rapid and efficient method of sharpening the cutting edge of the handy American glass-cutter. This is generally done, according to the directions of the maker, by holding the instrument at a particular angle and rolling it backwards and forwards on a hone—an operation both somewhat tedious and unsatisfactory. He takes a strip of lead or, better still, a piece of flattened gas pipe about three inches in length, and by running the cutter once or twice along it makes a suitable groove. In this groove he places a little fine emery and a few drops of water, and then runs the cutter in it for a few seconds, which gives it an edge equal to that which it possessed when it left the maker's hands.

I have at last had an opportunity of examining some specimens of M. Leon Vidal's photopolychromy, and think that both M. Lacan and Mr. Sutton have much to answer for in the way they have spoken, or rather written, about it. In common, I suppose, with most of the readers of the Journal, I have passed many months of expectant anxiety in waiting to see specimens of a process which was described by one or other of these clever writers as "characterised by all the beauty of a clever water-colour drawing, executed by the hand of a master;" and, again, as a "wonderful result of printing in pigments, and a triumph of ingenuity and perseverance." Futher: it is described as "a really marvellous production on its own abstract merits. It is as beautifully finished in every respect as a copy in colours can be, and leaves nothing to desire." Again: M. Lacan says "the colours blend and harmonise as if they had been spread by a skilful pencil. The specimen leaves far behind it all that could be accomplished by chromolithography." Lastly: Mr. Sutton writes—"After years of laborious experimenting, and with difficulties to be surmounted at every step, he [M. Vidal] has gone on pluckily until he has reached the goal at last." After such statements I humbly think we were entitled to expect something really good; but in the interests of truth I feel bound to say that I am grievously disappointed. The specimens I have seen are poor—very poor; in fact, so like the rude and generally loud examples of chromolithography which adorn the covers of a child's twopenny story-book that for several days I actually mistook them for such as they lay amongst a number of papers on the table at which I was writing. I certainly admire the plucky perseverance of M. Vidal, and hope yet to see his undoubtedly great ability turned to valuable account; but I cannot help saying that "the years of laborious experimenting" would have been better spent in a different direction.

An "Old Exhibitor," dating from Glasgow, suggests in a contemporary that the pictures forming the exhibition at present open in London should be brought bodily to Edinburgh, for the purpose of stirring the Scottish photographic mind, and gratifying the Scottish photographic eye. The thing, however, will not do—first, because, if the report of several of our local photographers, who made a special pilgrimage to London on purpose, is to be relied upon, it is not worth the trouble; and, secondly, the Society to which an "Old Exhibitor" alludes has been defunct for years, and the "considerable sum of money" divided amongst the surviving members—an act which I may here digress to characterise as a piece of the grossest photographic vandalism (whatever that may be) recorded in the history of the art. The money was subscribed for the advancement of photography, and to that purpose only should it have been applied. There is no use, however, in "crying over spilt milk," and there really is no necessity. The Edinburgh Photographic Society, although it has little pecuniary means, has that which is much better—zeal and ability to go in for anything of real value to the photographers of Scotland as a body; and by an "Old Exhibitor" communicating with the Secretary he will learn that there is at present under discussion a proposal by which, if the aforesaid photographers generally will co-operate with the Council, an exhibition will by-and-by be got up that will do all that he suggests, and much more. I may, however, to prevent disappointment, say at once that co-operation means, amongst other things, a small subscription to a guarantee fund; because, while the Society may be both able and willing to take upon itself all or most of the labour in connection with such an exhibition, it is not in a position to run any pecuniary risk.

Since writing the observations made at the beginning of these notes about Mr. Turnbull's studio, I am glad to say that the hurricane of Friday last has blown it down. It does seem hard-hearted to rejoice over the misfortunes of a friend; but as he really could not, in rebuilding, make it worse, the chances are that he will make it better, and so will in the end be a gainer by the calamity.

I have long had a considerable admiration for the genius of your occasional correspondent, Mr. D. Winstanley, but I would take the liberty of quietly hinting that if every photographer who, during the last twenty years, has hit on some little wrinkle or dodge had run off with it to the patent office, or sent it out in sealed packets, like "Saunders's face powder" or "Ninion's bloom of roses," at two guineas apiece, neither he or I would have known a tithe of what we have learned. I do not, of course, mean to say that I object very much to his trying to sell his secret process if he can, but I do object to his puzzling simple folks with his anagrammatical explanation, as it appeared in the Journal of last week, and think that if he had made a clean breast of the whole affair at once it would have been a gain to everybody, and, perhaps, not much of a loss to himself. As, however, he has set the example let me for once follow his lead, and put in the anagrammatical form my opinion of the transaction:—A_7 B_1, C_{12}. My readers can fill in the rest of the alphabet, and supply any small figures they like, as I can easily manipulate it into the suitable translation when the proper time arrives.

And now, as the daily work of the photographer is, in spite of its variety, somewhat monotonous, and he is all the better of a good story now and then, I shall conclude my present batch of *Notes* by relating an incident which occurred some time ago in Mr. W. Neilson's studio. There was ushered into the reception room, one fine forenoon, a respectable-looking but rather quaintly-dressed countrywoman, with a tolerably large basket on her arm. She seemed a little perturbed as she looked round at the rather elegantly-furnished room; but the genial manner of our friend soon put her at her ease, although she could not be prevailed on to sit down, declaring "sic grand chairs were not made for the like o' me." After a few preliminary observations regarding the weather, the following conversation occurred:—

"I hear you're a braw photographer and can mak' grand pictures, an' deed if ye drew a' that's on the wa' I am thinkin' ye'r even better than I've been telt. Noo, sir, I'm wantin' ye te do me a great favour, for which I'll pay ye weel, for I'm no maybe sae puir as I look. Ye maun ken that I've a son, a rael bonny lad, an' he's just the pride o' my life, an' I want ye te mak' a picture o' him to comfort me when he's far awa'. He's ow'r sax feet high, wi' fine blue een and brown curly hair, an' cheeks like roses—in fack, just the best-looking lad in a' the country side. If ye'll just draw his pictur' for me I'll pay ye whatever ye charge, and see (opening her basket) here's three dozen new-laid eggs an' a pair o' fine fat chuckies into the bargain!"

"Well, my good woman, I shall do my best to get a good likeness of your son, but there was no necessity for bringing the eggs and fowls. Just send him up at once, and you may take home the picture with you to-night."

"Send him up!!! Eh! dear sir, he's awa' in Australia!"

JOHN NICOL, Ph.D.

MOULDS FOR RELIEF PRINTING.

THE end I have in view is one of which, were it shown to be an accomplished fact, photographers would not be slow to avail themselves, viz., the production of *carte-de-visite* prints with a Woodburytype press—an instrument so comparatively cheap as to be within the reach of all. It is also a subject in connection with which I am glad to find others show an interest, and when the advantages the photo-relief process enjoys are fully seen there will be no scarcity of experimentalists in this direction. It is said, with an amount of truth not generally found in the sayings of men, that in experimental matters failure is often as valuable as success; and I sometimes think that were photographic experimentalists to record their failures it would prove of great value, if only to point out what to avoid.

The oxychloride of zinc was tried for the purpose of making moulds, and so far as sharpness was concerned left nothing to be desired; in short, every quality was easily obtained, with one exception, and that was a fatal one, namely, the oxychloride was soft. It having been reported to yield a concrete rivalling marble led me to suppose it was some fault in my manipulation; but, on making several trials, beginning with quantities having atomic weights of the chloride and oxide, and varying considerably on either side of the same, I was led to the conclusion of its inadmissibility.

While drawing attention to sealing-wax and other bodies of a similar nature mentioned by Mr. Woodbury and "S. W. G.," I may say I have been experimenting with such materials without being aware of its having been done before, and can add my testimony to the value of these substances. However, care must be given to so adjust the ink as to allow of its being kept below the temperature which would cause the moulds to soften. In the case of any who may feel inclined to experiment with the before-mentioned substances I cannot do better than refer them to the articles on *Printing Moulds* by Mr. Woodbury and "S. W. G.," at the same time advising them not to overlook the circumstance mentioned by Mr. Woodbury, to wit, that they are included in his patent dated May 30, 1873. Whether they are the subject of patent or not I cannot say, and they who feel interested can easily obtain a specification from the Patent Office.

The method of obtaining moulds mentioned by "X. Y. Z." [*ante*, page 465], while being similar in its nature to that of Mr. Woodbury, has some points of difference which make it worthy of trial.

Fusible alloy is a body having qualities of great value. It is easily put into the fused condition, and when cold is much harder than the usual metal used for the relief process, and hence would stand more wear and tear; this, however, would only be valuable when large quantities are required from one plate, which seldom happens in ordinary practice. The alloy may be used in a similar manner to sealing-wax; but its price, when compared with the latter, at once precludes its use when equal results can be otherwise obtained. In fact, it was this, along with its deterioration with continual heating, that led me to seek another material, which, it appears, has been already found.

It has been shown that moulds can be produced without expensive pieces of apparatus, and for this let us be thankful.

The relief has yet to be studied, and on some future occasion it will not be time wasted to run over the qualities required of it to produce moulds giving good results. W. E. Batho.

IMPROVED HOLDERS FOR LANTERN TRANSPARENCIES.

With the view of presenting a panoramic view by means of a magic lantern Mr. J. V. Hatch, of Huddersfield, has introduced a slide-holder, for which certain advantages are claimed. In the holders now in general use the slides are pushed in or through by means of the hand, which, in the case of panoramas, the inventor considers detrimental to the general effect.

In this slide the lower part on which the picture rests is formed of an endless band passing over two rollers, which are rotated by means of a winch handle, as shown in the annexed diagram. It is obvious that in this way the picture will be carried forward in a smooth, uniform manner.

The holder has been provisionally protected by patent, the specification being as follows:—

This invention relates to improvements in magic-lantern slide-holders, whereby the slides are caused to travel in a continuous series slowly in succession past the opening opposite the lamp or other light employed for exhibiting the object or image depicted upon the slides, thus producing panoramic effects.

The slide-holder is so arranged and constructed that the top and bottom edges of the slides are retained in grooves or guides formed upon the holder, the slides resting in a vertical position upon, and being carried by, an endless band mounted on rollers attached to the slide-holder, or otherwise.

The slides are introduced between the guides in succession, so as to be supported vertically, end to end, upon the endless band, to which motion is given by a crank handle upon the axis of one of the rollers, or otherwise, by which means they are caused to travel slowly whilst the image or object thereon is exhibited upon a screen, in like manner to a panorama, as is well understood; or each successive slide may be kept stationary for a time at the will of the exhibitor.

In place of employing an endless band for carrying the slides they may be supported upon, and carried by, other forms of carriers in accordance with my improvements—such as a tape of woven fabric, leather, or other material, wound to and fro upon rollers; or other slides may be mounted upon carriers actuated by a rack and pinion, or otherwise.

The patentee cites the following as the advantages of the improved slide-holder—

1. Panoramic effects are produced, equal, if not superior, to those obtained by the costly and bulky paintings on canvas hitherto employed.—2. Any subject can be painted to order in a fraction of the time, and at considerably less cost, than those produced on canvas by the ordinary method.—3. As one lantern only is required the trouble and inconvenience of dissolving is obviated, and one-half of the expense saved.—4. The screen is never left a dazzling blank.—5. The whole can be easily managed by one person.—6. When one view has been properly focussed and centered no further adjustment of any kind is required.—7. The views can be arranged in any order at the option of the exhibitor, thereby enabling him to produce panoramas of any description.—8. The effect is novel and pleasing.—9. The cumbersome wooden frames enclosing the pictures or slides are dispensed with, thereby allowing a large number of views to be packed in the smallest possible space.—10. The whole arrangement is so simple and yet so perfect, and so entirely under the control of the operator, that the failures and disappointments connected with dissolving-view exhibitions are reduced to a minimum, and success becomes a certainty.

Furthur: that by means of a second carrier or endless band two distinct and separate motions are produced, capable of being varied according to the will of the operator, thereby enabling the ordinary "effects" to be introduced into any picture in a moment, with a degree of ease and perfection hitherto unattainable even by means of the well-known costly and troublesome mechanical appliances usually employed to produce each separate "effect."

We have not seen any of these holders, but there is no doubt that that they will answer the intended purpose very well.

A NEW HELIOGRAPHIC PROCESS—"AUBELDRUCK."

After Daguerre's initiatory invention the improvements on it came one after the other so indiscriminately as to jostle inconveniently and destroy the gradual order of succession usually observed in the perfection of a new process. "He that follows another cannot precede him" is a German proverb quoted with reference to this subject by a writer in the *Photographische Correspondenz*. But at last (he proceeds to say) out of the efforts to take photographic pictures upon sensitised paper the question arose how to render durable these evanescent children of light—in other words, how to obtain them by actual impression and in permanent materials. In spite of the general activity in this direction, the various means employed to attain the end by photo-chemical processes, and the extensive experience so obtained, the energy displayed was still in a wrong direction. So long as the *ignis fatuus*, gelatine, continued to be followed—so long as that treacherous medium remained in use as the basis of the sensitive film, whether upon stone, glass, or metal plates—the most remarkable results and the most pleasing pictures could only be classed as accidental successes, to be rejoiced over in a qualified manner.

Indeed, in heliography, as it is now known and practised, the results are quite inadequate to the expense and time entailed in their production, and any benefit derived therefrom may consequently be placed to the account of art rather than industry. Of the usual processes so much only is known as that stone, metal, glass, or other plates are coated with gelatine, glue, or gum mixed in certain proportions with bichromate of potash, or with bitumen dissolved in oil of lavender, ether, &c. By these means, after removing the parts of the film unaffected by light, and, therefore, soluble, plates can be obtained by treatment with acid, or, by the help of galvanic action, impressions may be etched in, or raised in relief, ready for lichtdruck. Another process renders it possible, by the application of printers' ink, to obtain a direct impression. Of these methods only four appear to have attained any practical importance.

After explaining these, and alluding to others not materially different, the writer goes on to say that the Aubel method is essentially unlike them all, requiring neither the complicated, costly, and lengthy galvanic process, nor the employment of such uncertain substances as gelatine, gum, or asphaltum, and, furthermore, that it does away with the necessity of transferring. The image is obtained by the action of light, directly, upon a hard but impressionable surface, from which, of course, it may be transferred to stone, wood, zinc, or other suitable support.

The precision with which this process reproduces every line of the original may be judged of by several instances quoted. It seems that a Prussian military map had been reduced to a size only $\frac{1}{15}$ of the original without the slightest blur, but with such good definition that the smallest writing on it could be distinctly read if moderately magnified, although so minute as to be hidden by a hair. A print from a negative obtained by the ordinary photographic process would not possess any such distinctness, the vague shading of the silver print and the misty brightness of the albumenised paper contributing to rob the latter proof of that clearness which forms so marked a feature in the new process.

That the Aubel process is especially suited for the production of stamps and, indeed, bank-notes which will defy imitation may be imagined from the fact that a hundred-rouble note, reduced to one-twelfth the size of the original (which is a specimen of the finest steel engraving), reproduces to perfection the imperial likeness with the most delicate cross-hatching, and shows every detail in the wavy watermarks of the paper.

If such a stamp or note be required, it is simply necessary to give as a copy a sketch in Indian ink, common ink, or lead pencil—say to the size of twenty inches square—and reduce it by this process to one or two inches square. On its transfer to an engraved block, the original being destroyed, the object can be completely attained, since to copy the stamp a difficult enlargement would have to be made, and retouching rendered necessary. Even then a proper optical instrument would at once detect the flaws unavoidable in such an operation. In fine, what principally distinguishes the Aubel process is that it not only reproduces the finest linear drawings—be they in chalk, lead pencil, Indian or other inks, as well as lithographs, copper engravings, xylographs, &c.—but even steel engravings possessing the most minutest detail, as, for instance, Kaulbach's *Reynard the Fox*, engraved by Schleich, which forms a fine specimen of the capabilities of the process.

The writer concludes with a panegyric on the perfection to which the heliographic art has thus been raised, which it is scarcely necessary to translate after the more practical evidence as to its merit we have already given.

ON SHORTENING EXPOSURES.

I am glad to see by the last number of the Journal that experimentalists are now actively taking up the subject of supplementary exposures, as it is only by practical investigations that we are likely to arrive at a solution of the problem as to what is the action which takes place in virtue of which a supplementary or pre-exposure to diffused light reduces the camera exposure by about one-half.

The result of Dr. Nicol's first series of experiments, recorded last week, seems to show him that, as far as the acceleration or production of detail is concerned, the result is *nil*, as he says that the exposure of the plate through pale green glass *may* be of advantage in the case of an under-exposed negative by causing a slight veiling of the shadows, thus preventing the negative printing too black and white, and that this is just what the supplementary exposure will do. Assuming this to be the true state of matters, he concludes that it will be evident that a very brief exposure to weak daylight will accomplish all that is required.

Now, up to about two years ago, and notwithstanding all that had been written on the subject, even from the days of the daguerreotype, I was of the same opinion as Dr. Nicol, viz., that the effect of the secondary exposure was to produce fogging of the shadows. I pooh-poohed any attempt at argument to the contrary, until one day a friend, in conversation, informed me that he had regularly in his daily practice, for a year or two previously, reduced his exposure in the camera by one-half by simply exposing the plate either before or after exposure in the camera (for it mattered not which) to the light of a gas flame he kept for the purpose in his dark room. I at once said that the effect must be due to fogging of the shadows. This my friend denied; and, knowing that he was as shrewd an observer as he was a skilful photographer, I did not pursue the argument further then, but determined to decide the matter, at least to my own satisfaction, by experiment.

The following day I commenced a series of experiments, which soon convinced me that something more than mere fogging was produced by the secondary exposure. Several of these experiments were made in conjunction with Mr. J. T. Taylor, of The British Journal of Photography, and were described by him in a leading article in the number for November 1st, 1872, followed by a second article the week after. These experiments proved that the effect was an acceleration or production of detail, and not fog; that the effect was caused by light alone, and not by any particular *coloured* light; and that it was immaterial whether the auxiliary exposure was made prior to or after the primary exposure in the camera.

As Dr. Nicol promises shortly to return to the subject and publish the results of further investigations, I strongly recommend him and all photographers who are still in doubt as to the utility of auxiliary exposures to make the following simple experiment, which, I think, will prove that something more than mere veiling of the shadows is produced:—

At one end of the studio arrange a group of dark objects (the ordinary furniture in use in the studio will answer the purpose), and in a conspicuous part of this group place a light object—an open book will be very suitable. Now take a bi-lens camera, and after focussing the group stop down the lenses, using the *smallest* stop for the purpose. The object of using a very small aperture for the lens is that the exposure is more under control and the effect more easily seen. Now expose a plate in the camera, so as to determine the exposure necessary to produce a well-defined image of the *open book only*, and not the furniture, leaving all the other part of the plate not occupied by the book bare glass. Then place another plate in the camera, and this time expose it to a sheet of white paper or cardboard placed at a given distance—say two feet in front of the lenses—to find the time required to produce a decided but not *dense* fog when the developer is applied to the plate for the time requisite to produce a negative in the ordinary way. When this is determined prepare a third plate and expose it to the group of accessories sufficiently long to impress it merely with the image of the book, and then expose only one-half of the already-exposed plate to the white cardboard for the time that was found necessary to produce the fog. Next proceed to develope it, when on one half will be found the image of the book only, surrounded by clear glass, and on the other the fog; but in this fog will not only be found the image of the book, *but of all the furniture*. There is no doubt that the secondary exposure produced the fog; but what causes the image of the furniture to appear whilst the other half of the plate shows no trace of it? A solution of this problem will, I think, help to settle the vexed question as to the formation of the latent image.

A simple experiment such as I have just suggested is worth any amount of argument, *pro* and *con*, as to whether a supplementary or a pre-exposure has any effect in adding to the detail in the negative.

E. W. Foxlee.

PHOTOGRAPHIC ADVENTURES IN COLORADO.*

We started, after three days in Este's Park, still adhering to our original plan of travelling north, although everyone said we could not possibly do it. The rainy season at this time commenced, and as usual was accompanied with thunder of the grandest kind. After marching for a day over some very rough ground (for all the ravines run east, and we were compelled to cross them) we camped on a "fork" of the Big Thomson. As it was a wet Saturday night, and there being no views adjacent worth anything, we decided to remain over the next day. My companion and I were somewhat puzzled how we would spend Sunday, now that we had a reverend gentlemen in camp. We could not make our clerical friend preach; for, although he had a glorious cathedral, he would have had but a poor audience, even counting the donkeys. We finally made up our minds to let things right themselves, and were soon enjoying refreshing sleep. Well, when I awoke next morning my companion was gone. On looking round I noticed that a fishing-rod was also missing, and guessed the rest. Without disturbing Savage I got my fishing apparatus ready and went too. After an hour's fishing I had enough trout for one day, so returned to breakfast. Fancy my astonishment when I found no Savage; his fishing-rod, revolver, rifle, and all were gone. Having got breakfast, I dressed myself, doing washing, &c., to keep things square. About mid-day my companion turned up with a good basket of trout; but still no Savage. Sunset was nearing and still no signs of him, so I thought I would go and look for him. After walking up the river for a bit I was startled by a tremendous crash of something falling from the cliff, and, looking up, I saw my friend amusing himself by tumbling rocks and dead trees from an elevation of 600 or 800 feet. After that we understood one another on the Sunday question. I was afraid he had fallen into the clutches of a bear, for we had heard some growling near our camp.

Our next day's march was a very hard one; for, after marching about ten miles, we found ourselves in the cañon of the Big Thomson, there being no way to get out but the way we came in. After looking round we thought there was no way but to follow it down and see if some gap would occur. My companion was particularly obstinate about going ahead. He was sure he could make it, of course, so he commenced to

* Concluded from page 465.

ford the river. We did not risk it until we saw him on the opposite bank. In he went, riding his horse and leading the mule, which was carrying all our blankets, spare clothes, &c.; and he had not gone many yards before man, horse, mule, and all were struggling in the water, the mule particularly taking a pleasure in just lying in it so as to soak our blankets thoroughly. After scrambling out, of course there was nothing for it but retreat up the cañon through terrible jungles, often losing our donkeys. Here our horses showed their good points; they would go through a solid wall of brush, and all we had to do was to get our heads down on the mane, shut our eyes, and hang on. Here a tremendous thunder shower overtook us, wetting us all to the skin; and one of our donkeys, while climbing up a steep place, struck a tree with his pack and went clean over the rocks. Fortunately they were not very high—in fact, a sort of sharp slope. You will think he was pretty well packed when, after revolving on his axis three times, he rose and walked along as if nothing had happened. Fortunately his load was provisions, so they took no harm. At the beginning of our journey I was careful to entrust my photographic apparatus to the best animals, and they never came to any harm. They would put up between two trees, and if too close would try the next opening, and so on.

It was now time to camp, and with wet clothes and wet blankets—in fact, everything wet—we were in a sad "drooket" mess. Piling a few loads of dead timber together and setting them on fire, by care we soon had a fire which lighted up the old craigs until they lowered red and yellow again, and, mixing a little alcohol with hot water and sugar, we were all right, partially dried our blankets, and went to sleep, and slept soundly too, although our blankets next morning were stiff with frost. We always got up before sunrise, and had all our animals packed by seven o'clock, breakfast and everything past, usually taking a bit of dried beef or ham, both of which we ate raw, by way of lunch. I can eat almost everything raw now, and certainly prefer the above-mentioned raw to being cooked.

In the morning we found a crossing, but a terrible hill of at least 3,000 feet, and hardly any hope of doing it; but by doubling hither and thither we made the top. The donkeys are perfection at this sort of work; they never try to go straight up.

I must hurry my narrative, or I shall dirty all the paper in the house; so I will pass over a week of this sort of thing, wandering over dry, sterile mountains—sometimes half-a-day without water, sometimes in places of great beauty. Many of the flowers are cultivated at home—geraniums, calceolaria, tiger lilies, many species of the cactus (awkward things to camp near), wild gooseberry, black currant, strawberries without limit, wild cherry, and many plants I do not know the name of. All the mountains are wooded on the north face, the south face being usually barren and sterile. At last we reached the Cache a la Poudre, and crossing easily—though broad not very deep—we camped, Savage making good company, plucking all the grouse, cleaning all the fish, and getting immense heaps of firewood full of pitch. He made a shot that day which I ought to mention. He was riding ahead a little when he saw an immense rattlesnake as thick as a man's arm, so he whipped out his revolver, jumped off his horse, and at about twenty feet distance shot the snake through the head as it was shaking its rattles. We killed a good many rattlesnakes on our journey. I galloped over them several times, and before I could get off to shoot them they often got in their holes. I will enclose some rattles if I can find any among my things.

Well, before we got out of our camp next morning we crossed the river five times. At last we found an outlet by hard climbing, and, leaving the river behind us, for we could not follow it, we struck still north. We were now on the borders of Colorado, and a few miles would bring us to Wyoming. Towards night we found a stock "ranch"—that is, a farm—and camped beside it, and called on the owner for milk. He was glad to see us, and, contrary to the usual habit, was very hospitable, making us come into the cabin, and cooking a few splendid meals. All the ranchmen can cook well. Here we stopped a day, living at "hake and manger," and hearing about the direction we were to take, for our ambition was to go to the head of the river.

This ranch was a fine specimen of the home in the backwoods. Along the rafters—it was all built of logs, and the chinks served the place of windows—hung rifles; I counted eight, all loaded and ready for action. In one corner was a bed, in another a stove, milk and butter machinery, but all clean and well kept. Here we lightened ourselves as much as possible of extra provisions, &c., for there is no way back but this, and we had a hundred miles west to go. A few miles above that place we again struck the river, and followed it, with a few exceptions, to its head. We had some fishing—at least all we wanted on the river. Near its head, after camping in, my companion and I went fishing, and caught in an hour and a-half 250 trout—all average sizes, and all out of one hole—with the rod and fly, Savage taking them off the hook for us. I was sorry we could not consume them all; but as we were leaving the river we salted them and took them with us, although after a few days they got bad, and we had to throw them away. After a week's travel from the ranch we reached the head of the river, getting a few negatives now and then; but I often passed scenes I would have liked. The weather was not always good, often windy, and we could not afford to wait. The lake is at an elevation of about 9,000 feet, and is a mile and a-half wide, by two miles long. There is nothing very remarkable about it; I got some pictures, however.

While crossing a high mountain a little farther back we saw the peak of a very rugged mountain away down south, and we thought that by going ten or fifteen miles in that direction we might see something grand; and, as this country is very little known, we were anxious to see all we could. Our provisions were about done. We had some flour, a small bit of ham, no coffee nor tea; but, trusting to that fishing pond on our road home, we thought we would risk it. Our course lay through a country heavily wooded, with a not very steep ascent, but very marshy. About evening we reached Timbertown, about 10,000 feet, and in the fag end of a thunderstorm camped above the snow, using the snow for our cooking. To the south of us was one of the most magnificent views I have seen. The mountain we had seen was the remains of an old volcano—at least, judging from Timbertown, 14,000 feet—and lava everywhere. We had travelled over it for four or five miles, now we were camped on it, and crags of it rising everywhere. After great difficulty we lighted a fire. We were camped on a narrow ridge not 200 yards from cliff to cliff. Tracks of the elk, bear, ibex, deer, &c., were everywhere. I thought we had arrived at the sanctuary at last. The sun was setting, and the thunder now vanishing in the distance, muttering and crashing from peak to peak.

We were now on the head waters of the North Plate, and looking into the south end of the North Park—a country not known to the United States Survey Office, consequently never mapped with anything like correctness. Well, as the sun was setting, I took my rifle in my hand and went to look for a foreground. Here we have to look out, for this is the battle-ground of two or three tribes of Indians, and sometimes a third party, unless well armed, fares badly at their hands; but firearms and pluck command even their respect. While wandering about I saw, about a mile away, in a green glade, three animals feeding which appeared to be stray horses; but, on thinking again that they appeared to be all one colour, I was sure they must be game, so the wind being right I went after them, and there was no time to lose, for darkness sets in quickly here. We have no gloaming—"at one stride comes the dark." Taking off my boots, for I had made up my mind to have food, I crept up and got within 120 yards, and could get no nearer. I had long been anxious to see the elk, a very scarce animal here, and now that I had a chance for a shot I felt sorry, and as if I was doing something wrong, to shoot at an animal as large as a horse. Taking a good look at them, I saw they were three stags, and, raising my rifle, I found to my dismay that it was too dark under the shade of the trees among which I was to make sure work of one. I felt sure I could hit him somewhere, so I blazed away right and left at once. My dog at that moment sprang out among them, but they paid hardly any attention to him, and he, thinking, I suppose, that I was shooting at somebody's cows, came back rather disappointed. I had to all appearance missed, so I felt for more cartridges. Fancy my disappointment when they were not there. I had changed my breeks after the storm, and left them there, so I stood and looked at them, and they, not knowing where the shot came from, thought it was a small dose of thunder, I suppose. After a short time they walked slowly away, and I followed to see if one of them was hit. After going about a couple of hundred yards one of them showed signs of punishment, and let me drive him like a cow. At last he stood up, and so did I. By this time Savage, hearing the shouting, and thinking there was something up, came running; but he had been out looking round and had nothing but his revolver. So he commenced pegging away at him with his revolver, and emptied the weapon, never hitting him once, although not fifteen feet from him; but then it was dark by this time. We then lay down, feeling sure of him; but after a quarter of an hour's waiting he got to his feet, and laying back his horns bounded into the forest. Savage quietly remarked that it was all a make-believe on the elk's part; while I assured him that he would only go a few hundred yards. We made for camp, and on our way, between us and the western sky, and only a little way off, we saw an immense bear standing looking at us, wondering if we were good to eat. So you may guess we gave him a wide berth, saying we would thank him to call in the morning.

Next morning was Sunday. Savage and I were before the sun, and, arming ourselves (plenty of cartridges this time) we went and took the track of our elk, and there, about two hundred yards from the place where he lay down, we found him. So we "grallached" him, and returned to camp with a quantity of tender loin for breakfast; got our pack animals, and took all that they could comfortably carry, leaving about half on the ground. He was about four times the size of the Scotch stag, but like that animal in every particular, and I examined him closely. They average 800 pounds clean, and this was a very large one, with fifteen pounds to his loins. We had him for four days.

As the weather was not very good—rain, thunder, and snow (in August) being prevalent—I was determined to have some views. We did not hunt any more; we made a truce with every living thing—hares, grouse, and even trout. Our favourite mode of cooking our elk was to take a piece thirty or forty pounds' weight and put it right into our immense wood fire, and let it burn for a few hours. We packed away about a couple of hundred pounds' weight of it for future use, salting it a little. Meat keeps well here, and if we had been down a couple of thousand feet we could have dried it all; but we were in the midst of rain and mist.

Our journey back was just a repetition of the old story. We reached the ranch and enjoyed a good meal, while we set them agoing at elk meat. From this point we made for the plains, travelling north-east; and, having reached the neighbourhood of the Kansas Pacific Railway, we parted with Savage, all being in good humour with each other. He was the only American that I have ever taken kindly to since I arrived in this country. I often hear from him yet.

We had been told that there were some curious rocks north of this point; so we resolved to see them, and accordingly travelled for a couple of days in that direction, about twenty-five miles a day. We were now in Wyoming State, but did not find anything about which it was worth giving ourselves any trouble, so we turned our head homewards. It was all plain sailing now. After a few days we reached the Colorado Central Railway; and, having passes on it, we put our spare things aboard. We were light laden then, and travelled seventy miles in two days. We reached home safely, having been out on the trip just two months to a day. The net results were sixty-three subjects, all duplicate, and a few whole plates.

I need not tell you of broken focussing-glasses, or of a camera picked up, after a sudden gust, in three pieces, taking a whole day to mend it with scraps of white iron, old spoons, &c. The tool-chest came in handy during that emergency.

After two weeks at home to get up mounts and backs, and seeing everything properly going, I started out on a second journey—this time to the south. My friend was so "used up" that he would not accompany me. I will not enter into the details of my adventures on this occasion. I think the present communication is quite long enough, and expect you do not get such lengthy ones every day. I am sorry it is so roughly thrown together; but I have not done it for the eye of a critic, but for that of a friend. It has been written in great haste and in spare moments. If you can read it and find it will while away a spare evening I am content.

Contemporary Press.

CLASS IN LANDSCAPE PHOTOGRAPHY.

[Philadelphia Photographer.]

To photograph a lake or river it is not sufficient that a view be taken simply showing the expanse of water, as anyone would readily see that this would be very tame and uninteresting. Like the mountain and valley, which are made to give character and support to each other, so land and water must be introduced to give form and distinction to a lake or river. Water is much the same everywhere under similar conditions, but the solid earth is full of variety. Localities are recognised by the characteristics of the surrounding landscape. The sailor knows what port he is nearing by the distant mountains that seem to rise out of the ocean, and, as he approaches, his judgment is confirmed by the general "lay of the land."

So in photographing a sheet of water it is necessary that a portion of the landscape—the hills that rise around it, or some conspicuous landmark, which will include a portion, at least, of the form and outline of the lake or river—should be introduced.

When the view includes a large breadth of water the effect is greatly heightened by the introduction of a boat, a log, rock, or island. But nearly all accessories may be dispensed with, and an almost enchanting effect produced, by taking advantage of the sun being obscured by a cloud, and catching the reflection on the water, which forms a broad avenue of light, and stretches far over the dancing wavelets as if to some fairy grotto in the dazzling distance. A view of this kind must necessarily be instantaneous, and then, probably, with a rather small stop to the instrument. These are usually called "moonlight" views, and, when well executed, the illusion is perfect.

A river view will usually include both its banks, unless it be very wide; and when its winding course can be traced by its mirror-like surface through a rolling and varied landscape the effect is very fine.

Waterfalls are usually attractive subjects, and many can be found away from Niagara or the Bridal Veil of the Yosemite. Such a view should be chosen as will give the comparative height and show the form, as far as can be, of the cataract. The view should not be too near, as a proper proportion of the surrounding rocks or foliage, as well as of the foreground, is usually necessary to produce the best effect in the principal subject.

When it is necessary to illustrate the magnitude of any subject there is no better standard than the human figure. By this the size of any object is comprehended at once, and it may rise into grandeur by its vast proportions, or sink into insignificance simply by comparison with this never-failing test. But in introducing a figure for this purpose give it something to do or be interested in. Never suffer any person to stand and gaze at the instrument. If some boorish individual persist in intruding himself upon your view make a blank exposure on him. He will suppose you have taken his picture, and will be likely to change his position. When he has gone, or thinks you have done with your view, then quietly make an exposure, with a figure or two of your own choosing introduced as you may direct. Let the person you may place in the picture be looking anywhere but at the instrument; nothing has a better effect than to see him or them contemplating the principal subject. It has the effect of leading the attention of the beholder more directly to it, and excites an interest that otherwise would hardly be felt.

Bridges of almost any size or style of construction are usually good subjects. The best effect is always produced by getting a perspective view, such as may be had from the bank of the river or stream, and at such distance from the bridge as will best give its form and situation.

There is no subject, probably, more fascinating to the lover of the picturesque than ruins of every description. These may often be found and introduced with good effect in connection with other scenery, but where the ruin possesses interest in itself it, of course, forms a subject which may be treated independently of any surroundings, except as such surroundings may serve as accessories. In this country, however, this class of subjects possessing general interest is scarce. Our people take pride, not in the ruins of their former greatness and glory, the remains of magnificent temples and fallen empires, but in the living, thriving perfection, the unequalled prosperity and greatness, of their country's glorious present; and aside from the temporary ruins of some of our burned cities we have nothing in this country that is at all worthy of special notice.

The last to be enumerated on the list is to many the most fascinating of all the subjects of outdoor photography. Instantaneous marine views, when well executed, possess a charm of real moving, active life that is found nowhere else within the scope of photography.

To succeed well with this class of work requires apparatus and chemicals especially adapted to it; though, as far as the chemicals are concerned, it is only necessary that they should be in good working condition for ordinary work.

Usually a portrait lens is used for instantaneous views, but some of the large-aperture view lenses work sufficiently quick. An instantaneous shutter is quite a necessity in making these views, and is the only means by which the exposure can be made short enough. There is always the latitude, however, in case of a very brilliant light, that may be taken advantage of by using the diaphragm, and thus bringing the light and time of exposure under control.

With instantaneous marine views, where it is desirable to introduce shipping or craft of any sort, a position should be chosen, the instrument placed and focussed, and particular notice taken of the points included in the view. If a vessel be seen approaching prepare a plate, and when she sails between the points you have selected, so as to be in proper position in the picture, then make the exposure. Never attempt to go after your subject, or to make a focus on a moving vessel, for she will continue to sail on, and possibly be out of your view before you are ready to take the picture. There would be exceptions to this in the case of a vessel sailing directly to or from you.

In all this work success depends very much upon keeping cool and doing all without flurry or excitement. Beginners are very apt to get nervous in their anxiety for success, and in this condition are liable to make mistakes and defeat their own efforts.

Correspondence.

THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—I observe in the current number of the Journal that there is a passage in the critique on the photographic exhibition by "A Visitor," which would lead the reader to infer that the landscapes contributed by me are printed with artificial clouds.

May I be permitted to state, as a matter of fact, that this is not the case?—I am, yours, &c., William Bedford.

326, *Camden-road, N.*, *Oct.* 24, 1874.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—During the past summer several photographers have expressed a wish that a photographic society should be established in one of the large towns of Yorkshire, and, indeed, judging from the number that have signified their intention of joining, I presume one can be started enrolling not less than twenty-five members to begin with. Leeds, Bradford, and Halifax present a very creditable front in nearly everything connected with photography; and as Bradford is the centre, taking in these two towns within a radius of eight miles, besides innumerable other towns and villages that support quite an army of prosperous and clever photographers, why not resolve to have a start this next month, making that town the seat of photographic government for the West Riding?

I shall endeavour, with a few of my amateur and professional photographic friends, to galvanise the "Yorkshire West Riding Photographic Society" into existence by the middle or end of next month. I have already elected myself enrolling officer for Halifax, and shall be glad to hear from anyone willing to co-operate with me in Leeds, Bradford, and other places, or to be informed of the names and addresses of gentlemen desirous of becoming members.

I can speak of the enjoyable evenings profitably spent at the meetings of such societies, and cannot imagine an enthusiast in the art that would grudge a walk of half-a-dozen miles to attend the monthly meetings of one of them.—I am, yours, &c., J. W. GOUGH.

Akroyden, Halifax, October 26, 1874.

[We are glad to find that the suggestion we made after our visit to Bradford and vicinity last year, relative to the desirableness of the formation of a photographic society in the West Riding of Yorkshire, seems in a fair way of being carried out. If such a society were once started and established on a sound basis it would, we feel certain, receive hearty support.—EDS.]

SURFACE PRINTING.—"BANKS & CO., LIMITED."

To the EDITORS.

GENTLEMEN,—The attention of the Directors of this Company having been this day called to your issue of the 16th instant, in which prominently appears a leader violently attacking Banks's patent, I, as solicitor to the Company, am instructed to inform you that the Company are prepared to uphold their patent against any infringement. Your article certainly verges upon libel, and I therefore request you to publish this letter in a prominent position in your next issue.—I am, sir, yours obediently,

8, *Great Winchester-street, London, E.C., Oct.* 27, 1874. JOHN WATERHOUSE, *Solicitor to the Company.*

[We willingly insert the above letter. Having a perfect recollection of what we heard Vice-Chancellor Malins assert on a late occasion, when a photographic patent formed the subject of an official *précis*, we may further say that we are really glad to find that the directors of "Banks and Company, Limited," are prepared to uphold their patent against infringement. Mr. Waterhouse and the company he represents are, doubtless, aware of the value of the proverb "to be forewarned is to be forearmed." In the article to which reference was made they cannot have failed to notice some items of previous publication concerning which they will, doubtless, be prepared to satisfy the Vice-Chancellor should they consider it advisable to uphold the validity of their patent before him. We here submit another item for the consideration of those interested. It had been said in our hearing that the processes we have published differed from that of Mr. Banks, *inter alia*, in this—that he specially mentions in his patent that he coats the plate with plain gelatine and sensitises it afterwards, whereas in those previously published the sensitising material (alkaline bichromate) has been mixed up with the gelatine. Let this be decided by the following quotation from a leading article in this Journal of a date *long anterior* to that of the patent:—"Coat a plate of smooth and flat glass with Nelson's finest gelatine applied warm, and of the consistence of a rather thick collodion. Put it on a level place to set, and then rear it up to dry. Plates in this state may be kept ready for use. To sensitise the surface mix equal parts of a saturated solution of bichromate of potash and water, and immerse the plate in this for a short time—say for about half-a-minute—and then set it up to dry in a dark room. When dry expose it to light under the negative of the line-drawing, the time of exposure depending upon the light. If the negative be dense an exposure of a quarter of an hour will do no harm. The plate is now placed in a flat vessel of cold water, by which the gelatine surface immediately begins to swell in all places save those represented by the lines of the negative. These remain unaltered, and are sunk, flat, and glossy. The gelatine picture is next made surface-dry by means of blotting-paper, and a cast in copper or plaster is taken from it in the manner well known to electrotypers and stereotypers. Such a cast will show every touch of the pen standing in high relief from the metallic plate, which, after having been mounted on a wooden block, is ready to be handed over to the letterpress printer to be printed from along with type." This quotation may, similarly to what we have previously written, be said to "verge upon libel;" but really we should be exceedingly sorry to libel the beautiful process of producing relief blocks by means of the swelling of gelatine which has furnished illustrations for our Journal, agreeable occupation for sundry spare moments for ourselves, a theme for numerous articles, critical and descriptive, and which has also afforded us the additional pleasure of receiving the above brief communication from Mr. Waterhouse.—EDS.]

FUMING PAPER.

To the EDITORS.

GENTLEMEN,—In reply to Mr. Russell Sedgfield I beg to state that I fume all my paper, and have done so for years. I do not find that it injures the negatives in the slightest degree; but this depends on how it is done.

I have a box with a net-work of string. At the bottom is a saucer with liquor ammonia. Having cut up my paper to the size required I place it in the box, a piece at a time, for about five seconds, then remove it and at once place it on the negative.

I have negatives in the course of printing from which grosses of prints have been obtained in the same way, and which are as good now as when first made. I could not do without fuming, it is so valuable; but it requires care in its use.—I am, yours, &c.,

Denbigh, October 27, 1874. W. HARDING WARNER.

EX-STUDIO PHOTOGRAPHIC PORTRAITURE.

To the EDITORS.

GENTLEMEN,—Taking an interest in ex-studio portraiture I was disappointed on reading Mr. Beattie's article, which does not contain one word of practical instruction on the subject, but seems written simply for the purpose of placing an artist-friend of his on a pedestal, "high as a mountain peak, far up in the clear atmosphere, drawing by the magnetism of his excellence all other minds after him." I quote Mr. Beattie's own words.

Are we children that we are to be told "many paint, but few are artists?"—that "many write books, but few books are read a second time?" &c., &c. *Apropos* of ex-studio photography we are informed that beautiful photographs were sent to Mr. Beattie from the Isle of Man. The name of the artist is not mentioned, and we are left in ignorance as to whether the photographs were taken in or out of the studio.

We are next informed that Mr. Beattie meets his artist-friend in the Isle of Wight, who had been sent for from Windsor to photograph the future Emperor of Germany and family, and he naïvely expresses his surprise that it is so—a surprise which I share, knowing how many excellent photographers were nearer. He informs us that this artist-friend possesses an intelligent assistant, every possible mechanical appliance, lenses to suit every condition of distance, backgrounds, shades of all necessary forms,* and, most important of all, "energetic brains," but no chemical speciality. The pictures produced were sent to Mr. Beattie, who exhausts language in their praise as photographs and works of art, and finally advises all undistinguished photographers to procure these pictures, and study from them as models of all possible excellence. We smile to hear friends bespatter themselves with praise in after-dinner speeches; but we look for something else in a scientific journal.—I am, yours, &c., A SUBSCRIBER.

October 26, 1874.

Miscellanea.

SERIOUS FIRE IN A PHOTOGRAPHIC STUDIO IN CHESTER.—On Wednesday morning last, at ten minutes to two o'clock, an alarm of fire was given at the fire brigade station, Chester. Superintendent Noblet, in charge of a reel, proceeded immediately to the scene of the fire, which was the back premises of Messrs. Minshull and Hughes's book, stationery, and photographic establishment, Eastgate-row. Other members of the volunteer fire brigade followed. The fire had evidently broken out in a room behind the library, and the flames had gained a firm hold, not only in the rooms of the photographic department, but also of a large wooden gallery which connected the library with the studio. In the face of a fierce heat, which blistered the woodwork of buildings and cracked the glass of windows behind him, Mr. Noblet brought a branch to play on the burning wood. After about three hours' hard work the fire was subdued. The photographic apparatus, chemicals, &c., as well as a quantity of paper and books, were totally destroyed, and eight rooms were completely gutted. The importance of the work done in extinguishing the fire was, however, great, as had there been a delay of half-an-hour the whole of Eastgate and Bridge-street rows, with their handsome, half-timbered fronts, would have been jeopardised. The damage done is estimated at £1,800—being £1,000, the value of materials, chemicals, &c., the property of Messrs. Minshull and Hughes, and £800 damage to buildings, which belong to Mr. Finchett, grocer. The loss is covered by insurance. At the meeting of the Town Council, held subsequently the same day, Mr. Sheriff Hughes (of the firm of Messrs. Minshull and Hughes) spoke in terms of praise of the fire brigade and the police on this occasion. The Mayor expressed his sympathy with Messrs. Hughes and Minshull—a sentiment which was echoed by those present.

PICTURE-DEALING FRAUDS.—Art-patrons have reasons to be more than usually cautious just now in their purchases. Even when artists get very little money for their works, unscrupulous speculators and "middlemen" have sold copies for originals, and put the names of famous painters upon the works of nonentities. In the present day this is done very extensively, and the results are additionally serious on account of the lavish patronage which the public bestows upon art. I am informed, on the best possible authority, that there never was a time

* What can be the meaning of "shades of all necessary forms?" Anything to do with spiritual photography?

when fraud in picture-dealing was so rife as it is just now. Copies of original pictures are sold and exported as originals, and clever young artists are employed to imitate the styles of well-known painters; and works thus produced are readily sold at large prices. Lord Porterhouse says he was cautioning a friend the other day upon this point, when the art-patron said:—"Ah! they don't get over me; when I buy a picture I invariably write my name or some directions upon the canvas." "Indeed!" responded Lord Porterhouse; "and who put you up to that clever device—a dealer?" "I forget," said the wealthy art-patron; "I think it was." "Just so," responded his lordship; "now I will tell you the latest thing in picture swindling. A fellow buys a picture by a good artist; he gets it copied; he frames the copy, and upon this lays the original which easily adheres to the other. You buy the original, and the dealer is particularly honest, he wishes you to have every protection, and suggests that you should write your name on the back, and there can be no mistake. You are delighted; you write your name on the back. When you have paid your money and left the place the original picture is stripped off, and the copy upon which you have written your name is sent home to you, and at some distant day is handed down to your heirs as a valuable work, while the real picture itself is adorning the walls of an American or continental collection, or may even be sold much nearer home." The art-patron, I need hardly say, was considerably astonished; and Lord Porterhouse declares solemnly that an incident of this kind recently took place.—*Pictorial World.*

EXCHANGE COLUMN.

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

I wish to exchange a Meagher's new folding camera, 10 × 10, with swing back, for a similar camera without swing back.—Address, R. Sedgfield, Norbiton, Kingston-on-Thames.

Four or five flock and gold show mounts, size 46 × 32, with fifty-six openings, will be exchanged for anything useful.—Address, W. H. Taylor, photographer, 8, Howard-street, Rotherham.

I have a whole-plate camera, of Spanish mahogany, brass bound, swing front, screw movement, and central partition for stereos., which I will exchange for other useful apparatus.—Address, W. Dakin, photographer, Nether Edge, Sheffield.

Wanted, a German glass bath for 12 × 10 plates, in exchange for one of Murray and Heath's water-tight baths in mahogany case and silver dipper, nearly new.—Address, Warburton, Fairlie Villas, Wellington-road, Fallowfield, near Manchester.

Wanted, a lantern condenser, a few slides, and a short focus quarter-plate lens, for which I will give in exchange useful articles for studio and a number of photographic lantern slides of Devonshire and Cornwall, well finished.—Address, Artist, 5, Crescent-place, Plymouth.

ANSWERS TO CORRESPONDENTS.

Photographs Registered.—

William Blakeley, Pendleton.—*View of Kirk Braddan.*

Peter Jones, Wrexham.—*Portrait of Mr. W. L. Daniel.*

H. Sampson, Southport.—*View of Lord-street, Southport.*

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

Henry D. Atkinson.—The enclosure has been forwarded.

George Brown.—There is no comparison between the two; select the bi-lens camera.

In Type.—Communications from E. W. Foxlee and G. W. Webster, F.C.S. In our next.

The Crawshay Prizes.—We have again to acknowledge the receipt of several letters on this subject.

J. R.—If the ray to be transmitted be not too oblique the form of correction marked *b* will answer quite well.

T. M.—There are still a few copies of the Almanac of the current year in stock, but the previous number is out of print.

Akbar.—We are not aware of any dealer in London from whom you can obtain a Leake's tent, as it has been superseded by other forms.

W. J. S. (Edgbaston).—We can only account for your failure on the supposition that you have added a very large proportion of ammonia.

A. S. Everton.—We have been given to understand that the country respecting which inquiry is made is not so good a field for enterprise as our own.

Henry Dunning.—We do not quite approve of either of the two samples of glass enclosed, but would prefer a thin plain glass, as nearly colourless as possible. That known as "Belgian sheet" is a suitable kind, and the cost will be only about one-third of that of the samples enclosed.

R. K. B.—The gentleman to whom you refer discontinued working for the profession more than three years ago. He has since then left London, and now resides in Milan.

F.R.S.—We can recommend Beale's treatise on the microscope as one of the best that has been written, especially in the amount of information it affords on microphotography.

J. Roberts.—By adopting a stop of half-an-inch in diameter placed from two to three inches in front of the lens, the ray represented in your diagram as *s* will be entirely cut off.

X. Y. Z.—You are evidently labouring under a misapprehension; the jurors were not appointed by the London Photographic Society, but by the donor himself. Hence your strictures fall to the ground.

Provincial.—We could easily give you the names of some London publishers, but we have reason for believing that none of them would care to add your views to their stock. You require further experience ere you can produce pictures which will compete with those of Bedford, even if you were to sell them at half the price charged by that skilful artist.

G. Chellvoir.—We could not, in the limited space we devote to replies to correspondents, give you such directions for lighting "Rembrandts" and retouching by means of the pencil as would prove of much service; and this is the less necessary inasmuch as several articles in this Journal have already been devoted to both subjects. To these we refer you.

Orphan.—Photography certainly affords employment to a large number of females, but the present is a bad time to seek for employment. Mounters are paid at the rate of from twelve to eighteen shillings a-week, and printers from fifteen shillings to a guinea. Show-room attendants usually receive a higher salary. Either of the first-named occupations would suit you better than the last, for a show-room attendant requires to be a good writer and clever correspondent, in which qualifications, judging by your letter, you appear to be rather deficient.

Robert Bridgart.—After carefully examining the transparencies—for which please accept our thanks—we conclude, first, that a better tone would have been obtained by the use of a platinum toning bath instead of the gold bath; and, secondly, that the haziness will entirely disappear if varnish be applied. The strength of the toning bath should be such as to require an immersion of about a minute to effect the conversion of the silver image. While we cannot explain the cause of the rottenness of the film we can recommend the application of varnish as an effectual means of preventing such rottenness.

Received.—Mr. Woodbury has sent us one of the circular American paper-cutters, or "photograph trimmers"—a drawing of which is to be seen in his advertisement in the usual place. It certainly does all that is claimed for it, namely, cutting perfectly clean ovals, cushion, or other fancy shapes with great rapidity. We have also received from Mr. Woodbury a copy of his work, *Science at Home*—a series of experiments in chemistry and optics adapted for the magic lantern. We shall have more to say about this work in our next number.——Mr. B. J. Edwards has sent us a sample of his XL collodion, which we have tried both with wet and dry processes. It gives an exceedingly fine and structureless film, and possesses those qualities which are expected to be found in a first-class collodion.——We have to acknowledge the receipt of the *Journal of the Society for the Promotion of Scientific Industry*—a new claimant for public favour. It is published in Manchester. ——Several reviews in our next.

Fire at a Photographer's.—On Sunday morning last, on the premises of Mr. G. Williams, Holloway-road, a fire broke out, which, after a short time, completely destroyed the house and furniture.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 4	Edinburgh (annual meeting) ..	The Hall, 5, St. Andrew-square.

METEOROLOGICAL REPORT,

For the Week ending October 28, 1874.

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

These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	RainFall.
22	29·88	W	43	47	54	39	0·06
23	29·91	NW	40	43	52	36	—
24	30·25	W	44	47	56	37	—
26	29·95	SW	54	56	61	51	—
27	29·95	S	55	56	63	50	0·14
28	30·00	E	56	56	—	51	—

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 757. Vol. XXI.—NOVEMBER 6, 1874.

ON PRINTING MAGIC LANTERN SLIDES.

As the months roll by each season brings into notice some process of photography which is specially adapted to the period. Thus, in the spring amateurs are busy with experiments in those methods of operating which relate to photography in the field during the coming summer; in the autumn they are printing and mounting the choicest gems which they may have secured during their holiday tour for their own portfolios or for the walls of the London Photographic Society's Exhibition; whilst even during the gloom and fogs of November they can find work for the camera in photographing microscopic objects, and also useful work in printing transparencies and magic-lantern slides. In short, the processes and applications of our art are so numerous that its votaries need never be idle.

Much has already been published in this Journal respecting the printing of slides for the magic lantern; but this is a subject which possesses so much interest—not only from a pictorial, but from an educational point of view—that it never should be allowed to drop. Although much has already been written and done in this direction, yet much still remains to be done, and we shall never cease to allude to it, at the proper season, in our columns, until perfection has been reached in the production of slides, and until the majority of our readers possess a magic lantern and work occasionally in reference to it by some really good method.

There are many ways of printing slides for the lantern. For commercial purposes the best and most economical mode is probably that in which the Woodbury process is employed. Here the negative must be the same size as the slide, and printing by contact is required in the first instance, in order to obtain the gelatine relief from which the metal mould is made. There is, consequently, only that one risk of damage to the negative. In perfection of result slides thus produced leave nothing to desire, and they may be of any colour or density at the will of the operator.

The next best process for securing perfection of results, combined with any shade of colour at will, is carbon-printing or autotype. But here, again, the negative must be the same size as the slide, whilst contact printing with a separate exposure to light is required in the case of every slide produced. At this season, we imagine, printing upon carbon tissue in a copying camera would be impossible, except by artificial light, which would be very costly.

We next come to silver printing by development upon collodionised plates. Here we may employ both printing by contact upon either wet or dry plates or printing in a copying camera. In the former case the negative must be the same size as the slide; but in the latter case it need not be, which is sometimes an advantage. It is an advantage also, in this latter case, that the negative is spared the risk of printing by contact. When wet plates are printed by contact with the negative, strips of cardboard must be placed between the two at the edges; but the definition in this case will never be sharp and good, according to our experience, unless both the negative and the wet plate are upon plate glass. When dry plates are used in contact printing there is always some risk of damage to the negative from scratches, and also the risk of breaking it by unequal pressure in the printing-frame.

Having thus reviewed the different methods of printing magic lantern slides at this season (for printing upon glass coated with collodio-chloride would be evidently out of the question, from the great length of exposure required) it seems pretty clear that the best method for an amateur to employ is that with the copying camera. By employing this process he will be able to select from his negatives, whatever their size or shape may be, such portions as may suit the lantern slide, and copy those portions only.

And now we come to the main object of this article, which is to suggest to those who take views with especial reference to magic-lantern slides, as well as to their ordinary printing upon albumenised paper, a method by which they may proceed with comfort and advantage.

In the first place, then, the plates may be six and a-half inches square, for reasons presently to be stated. Having taken a negative upon one of these plates—such that a central circular view for a slide may be cut out of it—the negative should be copied upon a plate of the same size to half the scale, so that it will just include four slides three and a-quarter inches square when cut into four. The advantage of taking four prints upon the same plate instead of only one is too obvious to need comment, and we will now explain how this may conveniently be done.

Each fourth part of the plate must be exposed separately to the negative, which in every case is to be placed directly opposite to it, and upon the axis of the lens. For this purpose the lens must itself be mounted upon a circular carrier, which will revolve, and thereby bring it in succession opposite to the centre of that part of the plate which is to be exposed. There must also be cross partitions within the camera, so as to divide it internally into four dark tubes. It now only remains to put the negative, by some simple device, into the four positions which it must successively occupy, with its centre upon the axis of the lens. This may be very easily accomplished by fixing it within a square opening in a square carrier a little larger than itself, and up a corner of that carrier. When this carrier is made to slide in a square groove at the open end of the camera, it will be seen by inspection that by removing it after each exposure and reinserting it properly the negative can be easily made to take the four different positions with respect to the plate which the conditions of the problem require.

The copying camera will, of course, be exposed to the sky in the usual way; and any suitable process, wet or dry, may be employed for the printing.

Instead of having the camera constructed in the way described the ordinary repeating-back system may be adopted with considerable advantage; indeed we know that cameras of this kind are regularly used by some of the most extensive manufacturers of lantern slides. In one such instrument that we have seen a plate $9\frac{3}{4} \times 6\frac{1}{2}$ is used, upon which, by means of one vertical and three lateral repeats, six transparencies are obtained of exactly the size required. Of course in this case both negative and lens remain motionless, the back alone having to be shifted.

The repeating-back system seems to have only one objection, and that may, perhaps, be disregarded, viz., that, in shifting from place to place the dark slide which carries the wet collodion plate, jerks may occur which may produce defects in the film. It is for this reason that we have suggested a simple method by which the dark slide may be allowed to remain at rest whilst the lens and negative are being shifted.

SENSITISING COLLODION PLATES IN DAYLIGHT.

To prevent any reader being misled by the above title we hasten to explain that what will here be said has reference only to a means of placing a collodionised plate in the sensitising bath in daylight, the exciting and subsequent removal of the plate being completed in the usual photographic darkness.

The means of effecting the sensitising of a large plate in a flat bath was shown at the recent Technical Exhibition Meeting of the South London Photographic Society, and fully explained by Mr. J. R. Sawyer. We now give an outline of the process.

A large, flat bath, with a copious "well" at one end, is mounted in a wooden frame fitted with a lid which closes over, and thus shuts the light out from, the bath. This frame is so constructed as to allow the bath either to stand at a slope or incline or to be laid down flat. The well being filled with nitrate of silver solution, and the bath placed in a nearly vertical position, the collodionised plate, which has been coated in the *light* room, is carefully placed on a ledge in the bath, the lid is then closed, and the bath tilted over so as to assume a horizontal position, when a flow of silver solution over its surface immediately takes place. At any stage between the closing of the bath lid and the time when the plate is presumed to be sensitised, the shutters of the room may be closed so as to exclude the light, or the bath may be taken into a dark room so as to permit of the plate being removed.

Among the advantages of this method of preparing plates, apart from the fact that in the use of a horizontal bath much less silver is required than in a vertical or dipping bath, while the ether has greater facility for evaporating, is this—that after a sufficient time has been allowed for the plate to become sensitised the bath may be reared up into a vertical position, or nearly so, allowing the plate to be thoroughly drained before it is removed, and this without the least fear of its becoming dry from the evaporation of the solution upon its surface, for it is all the while confined in a thoroughly moist atmosphere. This, in the manipulation of plates of large dimensions, will be found no small advantage.

We may state that the bath forming the subject of these remarks was constructed of well-varnished wood, with a fluted glass bottom.

ON POPULARISING PHOTOGRAPHIC SOCIETIES.

At a time when the council and committees of the various photographic societies are making their arrangements for the work of the forthcoming season it may not be out of place to say a few words on the best means—or, at least, what we consider one valuable means—of giving popularity and interest to their proceedings. It is an undeniable fact that during the past twenty years many societies having for their object the promotion of photographic art have sprung into existence, and, after a period more or less brief, have gradually died a natural—or, may we not rather say, unnatural?—death; while it is no less true that there are some still alive which find the struggle for existence tax their energies to such an extent as to leave them able to do little, if any, real good.

In the early days of photography, more especially within a few years after Archer had shown the value of collodion, the devotees of the art were so numerous that, wherever two or three men of ordinary zeal and energy resolved to band themselves together for mutual benefit and photographic intercourse, they had no difficulty in finding numbers ready to rally round the standard which they had set up, and to form themselves into a society of sufficient numerical strength for all practical purposes. The societies thus formed had, of course, no lack of subjects with which to occupy attention. Almost every day brought with it something fresh for exhibition or discussion; and improvements in formulæ and manipulation followed each other so rapidly, and the results were so charming, that nearly every second man, and well-nigh as many of the gentler sex, adopted the camera, either professionally or as a pleasant means of recreation, until we might have been called, not a "nation of shopkeepers," but of photographers. By-and-by, however, this abnormal interest gradually died out, and with it hundreds of cameras were laid aside which had only been taken up because it had become a fashionable pursuit. But photography itself lost nothing by this wholesale secession from its ranks, as the real workers—those who loved it for its own sake, and those by whom the work of improvement and discovery was carried on—continued to devote themselves to it with unabated zeal. In this way, although the practice of photography as a profession at the present time is one of vast importance, as a change of occupation or as recreation for the amateur it has ceased to have the universal hold it once possessed; and, although its followers are still numbered by thousands, it forms only a unit amongst the numerous methods of pleasantly and profitably spending a leisure hour.

This gradual falling away in the number of amateurs has, of course, considerably lessened the available *matériel* from which photographic societies were recruited, the result being that, as shown by our Almanac of last year, Great Britain and Ireland possess only eight associations having for their object the promotion of the photographic art. This, we presume to think, is not as it ought to be, and we are certain that three times that number might easily be organised, with much benefit to all concerned and with great advantage to the art itself.

We are perfectly aware of the usual objection made to such a proposal with reference to any particular town or locality, namely, that there are not a sufficient number of persons interested in photography to warrant the expectation of the undertaking being successful. But we believe such objection to be altogether groundless. It is no doubt true that, in many cases, if the society were to rely for its support on those only who actually practise the art it could not succeed; but we feel persuaded that there is no necessity for such restricted membership. What would become of our musical associations if there were no outside public to appreciate their efforts and to aid in carrying them out, and of our academies of art if there were no exhibitions at which the work could be seen? We have some doubt whether our great boat races and cricket matches would continue to attract such numbers to the work if the public appreciation and applause were withdrawn.

We take it for granted, then, that in all but the larger cities of the country photographic societies, to be successful, must include in their membership many whose only connection with photography is the ability to appreciate the charming work produced by its artistic votaries through its means, and who, for the sake of seeing the results of their labour themselves, and probably of giving their friends also such an opportunity, are willing to pay the requisite annual subscription and take their share of the necessary work.

The point to be solved, then, is how best to attract and retain such members. It is one of considerable importance, and should command the attention of all interested in the advancement of photography. Amongst the many methods which have been proposed with this object in view, and which have been brought to the test of trial, not one has proved so successful as those "popular evenings" carried on by one of our most energetic societies for the last ten years. The object sought to be accomplished by the origination of the "popular evenings" was to afford to the members and their friends an opportunity of seeing each other's work under more favourable conditions than could be the case where prints were simply laid on the table at the meetings. For this purpose a first-class lantern was procured, and each member who wished to exhibit his pictures made transparencies from his negatives, or got them made for him. On the exhibition nights each member was entitled to introduce a friend, and these exhibitions became so successful, and the applications for admission so numerous, that in a short time a larger hall had to be engaged. At the present time the exhibitions are held in a hall capable of accommodating an audience of a thousand persons, and every part from which the screen can be seen is generally filled. The "popular evenings" are usually four in number, held in November, December, January, and February, and the pictures for each exhibition generally form a connected series. Sometimes they are the work of the members, but more generally they are procured from some extraneous source. The exhibition is always accompanied by a descriptive lecture, which affords general information and imparts additional interest to the series of pictures. Each member of the society is entitled to admission on presenting his ticket of membership, and, in addition, gets three tickets for the admission of as many friends; and so highly is this privilege valued that, although the society numbers over three hundred members, probably less than twenty per cent. of that number are in any way connected with photography.

In the "popular evenings" conducted in this manner we believe will be found the key to the successful carrying on of a photographic society in nearly every town of considerable magnitude in the country, the only other thing necessary being half-a-dozen energetic men willing to put their shoulder to the wheel; and we speak from experience when we say that in the success of such society those gentlemen will find themselves amply rewarded. But the benefits of the "popular evenings" are not confined to the increase of a society's membership—they are capable of exercising a lasting influence on the general public, educating and elevating its taste, and making it familiar with scenes and places in a manner that cannot be accomplished so successfully by any other means; while on the members themselves—we mean those who actually take to the field with the camera—the influence is no less valuable. The very fact that each picture taken may be useful in completing a series for one of the exhibitions of the succeeding winter gives an additional stimulus to the photographer, by inducing him to do all in his power to produce only perfect work.

We heartily commend the subject to the attention of our brethren of the camera, as we are certain that, wherever two or three photographers are gathered together, there will be found the germ of a photographic society that only needs careful treatment to be developed into a living fact, equally pleasant and profitable to all concerned.

AN EXTEMPORISED AND PORTABLE DEVELOPING DISH.*

Among the various useful little "dodges" exhibited at the Technical Exhibition of the South London Photographic Society last week we may specially mention one, introduced by Mr. Harrison—a gentleman whose name is associated with that of Mr. J. R. Johnson as the patentee of the well-known and ingenious pantascopic camera. It is a method for extemporising a dish or square flat vessel for developing or any other similar purpose.

It consists of four straight pieces of wood of any desired dimensions, bevelled in such a manner as to fit together at the corners so as to form a square or oblong frame. These are hinged together, by means of bits of cord or twine at three corners, so as to admit of the four pieces being folded up and laid side by side, thus ensuring the maximum degree of portability, while the fourth corner is fastened by means of an india-rubber band attached to one limb and hooking over a screw fixed in the other. So much for the frame.

A sheet of paper, having been cut to a proper size, has its edges turned over so as to form a tray, and each corner of this tray is deftly introduced in the open corners of the wooden frame just described, which is not locked fast by means of the india-rubber band referred to until all the corners have been inserted. In this way a very excellent tray is extemporised in a few seconds.

The applause which greeted the exhibition of this excellent and simple photographic appliance, and the suggestions made with a view to further increasing its efficiency, proved how much it was appreciated by the meeting.

As we have the frame at our office, any person who may call for that purpose will have an opportunity of examining it at leisure.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

[Fourth Notice.]

Those who imagined that Mr. G. W. Wilson has been indulging in *laiser-aller* of late years from the fact of his not having contributed to the Photographic Society's Exhibition, will have by this time become aware that *if* he had been in a somnolent condition he has become thoroughly roused, and, as if refreshed by his late period of inactivity, is "out" with greater power than he has ever before displayed. Certainly we have never seen any of this great artist's previous work that could equal, much less surpass, the fine collection of twenty-four choice views of Scottish scenery by which this year's Exhibition was enriched. To use a well-worn, but never more fittingly-applied, epithet, "they are veritable gems." Viewed in detail some of the rocks and boulders in the pictures might, owing to their sharpness and singular clearness, serve for the purposes of geological study, while this intensity of definition is not at all incompatible with the breadth of treatment so characteristic of Mr. Wilson's artistic productions.

We were also glad to see the works of another well-known veteran artist—Mr. Frith—adorning the walls of the gallery. It is scarcely possible to conceive of anything finer than the pictures of Mr. Frith as there exhibited. Let us hope that photographers of such acknowledged calibre as Mr. Wilson and Mr. Frith will again appear in full strength at next year's photographic exhibition.

There was not much possessing a special character in the Exhibition. With respect to book illustration Messrs. Spencer, Sawyer, Bird and Co. showed some pictures, both portraits and landscapes of small size, printed by their "mechanical" process in printers' ink, which were finer in quality than any works of a similar character we have seen produced hitherto by this enterprising firm. But for the specific intimation relative to the mode of production we should have imagined several of the specimens exhibited to have been produced in the printing-*frame* rather than by the printing-*press*, so delicate and fine was the gradation. Then, again, the Woodbury Company also showed with immense force. Provincial readers may not, perhaps, be aware that by means of the Woodburytype process some London weekly publications, mainly devoted to theatrical interests, are now regularly illustrated; hence for twopence any person may purchase both a journal and a photograph of some celebrity, which photograph is not necessarily inferior, but is sometimes superior, to that for which a shilling is charged in other directions.

While referring to *specialités* we may mention the enamels of Messrs. Faulkner and Keene, and the carbon transparencies of Mr. Faulkner. When it is considered with what extreme ease, little cost, and absolute certainty carbon transparencies can be produced, it appears somewhat surprising that more works of this kind are not issued than is at present the case. If the directions we gave some time ago be followed, we guarantee that any photographer who is not a veritable dunce may, almost at the first attempt, produce glass transparencies which, as respects tone and quality, will rival, and, as regards permanence, will far surpass, the choicest productions of Ferrier, whose albumen transparencies have hitherto been so justly admired. Speaking of transparencies, it is impossible to overrate the beauty of a collection by Mr. W. B. Woodbury, printed by the Woodburytype process from negatives by Mr. F. M. Good. Of the capabilities of this process for producing transparencies on a large and cheap scale we speak in another page.

Mr. Frank Howard also exhibited transparencies, his pictures being intended for the stereoscope rather than for the lantern. There is a great difference between the needful demands of these instruments. A picture which, as a transparency, meets to the fullest extent the requirements of the stereoscope, will make but a poor, smudgy-looking lantern slide; while, on the other hand, a lantern picture of the best class will make but a feeble, washed-out-looking slide for the stereoscope. The lantern transparencies by Mr. York were such as to prevent his known reputation as a most extensive producer of these to suffer in the slightest degree, being developed and toned with an amount of discrimination betokening a thorough acquaintance with the demands of this most important and still increasing department of photographic trade. Mr. Ferneley's transparencies, as usual, were good; but we are slightly at a loss how to speak of some lantern pictures exhibited by the Misses Davison, inasmuch as they were only paintings, and made no pretension to being even executed on a photographic base.

A portfolio of views taken in Java and the Indian Archipelago by Mr. Albert Woodbury proved a very attractive feature in one of the smaller rooms. This artist is without doubt a most skilful photographer. He must have had numerous charming scenes at his disposal—to speak in camera fashion—and he has represented those undertaken by him with consummate skill. While examining Mr. A. Woodbury's well-stocked portfolio we had the advantage of being accompanied by a shipmaster intimately acquainted with most of the scenes depicted, and who could narrate historical incidents connected with many of them. This was no small advantage when looking over a collection of pictorial delineations acquired in a country so interesting to Englishmen as Java is at present.

The enlargements in the Exhibition, on the whole, indicated progress. Messrs. Spencer, Sawyer, Bird and Co. were the largest exhibitors in this department, and among many other excellent works shown by them a view of *A Joss House*, from the negative of Mr. J. Thomson, was particularly noticeable. Several enlargements by the Woodburytype Company were also very fine; but of these, as well as of similar works by Mr. B. J. Edwards—which were shown in competition for the Crawshay prizes—we shall not now further speak; it is sufficient to say that they were generally well defined and good. There were several enlargements possessing much merit which were exhibited in another department of the Exhibition—that appertaining to the Crawshay prizes. In connection with these we may "couple the names" of Vandyke and Brown, Ferranti, Edwards, and Palmer, also the Woodburytype Company; while correlatively with the same competitors we mention the names of Bool, Robinson and Cherrill, Bruce, Gulliver, Williams, Hudson and Purnell, Vaughan, Sutcliffe, Crawshay, Sanderson, Nicholson, Smyth, Piper, Mitchell, and others, as having exhibited landscapes, some of them possessing features of great excellence, but which, being exhibited for a definite purpose, do not here call for specific notice.

The warm, sunny tones of a series of admirable little views by our occasional contributor, Mr. H. B. Berkeley, could not fail to extort admiration. This gentleman's pictures were exceptionally fine.

In our next we shall conclude our notice of this year's Exhibition.

Reference has been made in the report of the South London Technical Exhibition to an appliance, exhibited by Mr. H. J. Burton, for retaining small pieces of blotting-paper *in situ* at the corners of the carriers of dark slides, so as to ensure the absorption of the silver solution, which, by re-flowing over the surface, might cause stains. The method is a very simple one, and consists merely in having a saw-cut at each corner. By pressing the blotting-paper into this it is effectually retained in position. We need scarcely remark that it is more or less within the experience of every photographer that, when bits of blotting-paper are placed loosely in the corners of the slide, one or more of them is eventually found attached to the surface of the plate on its being removed from the dark slide. This may be effectually prevented by the simple precautionary means here proposed.

There appears to us to exist in America a reciprocity of feeling between photographic employers and *employés* of which we do not find much evidence in this country. While perusing the reports of such meetings as that of the annual American Photographic Convention we have been frequently struck by the apparent desire on the part of the "boss" to award all due credit, where such could be done, to his operator. In England, on the contrary, no such kindly courtesy seems to exist, operators being not infrequently treated as if they were quite unworthy of having their names associated with, or their deeds recorded by, their employers. And yet the "operator," as he is somewhat shabbily designated, is a power that may make or unmake a business. We are aware of the fact that a large and valuable connection was entirely lost to a photographer simply through what was mistakenly considered an advantageous change in the "operating" department. There is by far too much loftiness and *hauteur* in the manner in which many operators are treated by their employers; hence the gratification one experiences when well-marked exceptions to this rule force themselves upon the attention. Such an instance occurred on Thursday evening week, when Mr. Sawyer, of the well-known Ealing autotype establishment, ascended the platform at the Technical Exhibition of the South London Photographic Society to assist Mr. H. J. Burton, and in some lucid observations tendered a tribute of esteem and appreciation to that gentleman (the senior operator of the firm of which Mr. Sawyer is a member), who had brought with him for exhibition certain things he had introduced, and which are elsewhere described. The harmony and good feeling thus proved to exist in at least one metropolitan establishment between employers and employed, and that without the slightest indication of the offensive patronising air peculiar to vulgar minds, cannot be too highly commended.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

V.—DISTILLATION.

Distillation—one of the leading operations in chemical analysis—is used, as mentioned in the last chapter, for the purpose of separating liquids of different degrees of volatility, or a liquid from a solid. There are a multitude of ways of performing it, and a very great variety of apparatus, all, however, constructed on the principle of converting the liquid into vapour by the application of heat and then condensing it again by the abstraction of heat. One of the earliest known instruments, and one still in use for some purposes, is the alembic of the alchemists, which is essentially a flask with a wide glass cap fitting tightly on it. Heat being applied to the contents of the flask the latter rise in vapour, which, impinging against the cold surface of the hollow cap, becomes condensed into beads of liquid that accumulate and run down its sides into a little reservoir or channel formed by the turning up of the lower edge throughout the whole of its circumference. This channel is now generally supplemented by a tube running out of it, which serves to carry off the distillate, as the condensed vapour is termed, into any suitable receptacle.

One of the most elementary forms of apparatus which serves for the distillation of small quantities of fluid is a flask with a bent neck, or fitted with a bent tube, which is directed into a V-shaped tube partly immersed in cold water or covered with a damp cloth, the angle being lowermost. Upon the application of heat the vapour which rises is condensed in the tube and collects in the angle.

A more complete form of instrument is a retort and receiver; and as this form is in practical daily use for many delicate operations it may be dwelt upon a little more fully. The retort, which is in shape like an egg, lengthened out into an exit tube very wide at its commencement, but tapering at its end to very much narrower dimensions, and in its whole length bent at an angle of about 50° to the body, is used for generating the vapour in. This is then conveyed into the receiver, which is kept perfectly cold, and there it condenses and collects at the bottom. The shape of the retort is of some importance, and care should be taken to select one properly formed. The bottom should be even and free from air-bubbles, spherical in shape, and not too thick. The neck must be evenly shaped, and without any bend or angle in the middle, as in that case the portion of the fluid which condensed on the top and neck of the retort would flow back again into it. Neither must the neck become narrow at the point nearest the body and then widen out before tapering off, as it would be open to similar objections. A well-shaped retort is wide at the beginning of the neck and then rather suddenly becomes narrower, but for the remainder of its length tapers off very gradually, so as to admit of its insertion into orifices of various sizes. In the use of this piece of apparatus it was soon found very inconvenient to have to pour all the contents through the long neck, and to meet this inconvenience the retort is made with an orifice provided with a short, welted tube on the top of the bend of the neck, almost over the centre of the bottom. These are called tubulated retorts, and the tubulure is made for either corks or stoppers, the latter being adapted for use with corrosive materials. The retorts for ordinary purposes are made in glass, but can be procured in porcelain, fire-clay, copper, iron, and lead, the last-named being used for such highly-corrosive fluids as hydrofluoric acid, &c. In certain manufacturing operations retorts of platinum are used; but these are foreign to the scope of the present article.

The receiver is a globular vessel of glass, &c., for receiving and condensing the vapour as it issues from the retort. It is provided with a long neck, widest at the end farther from the body, and gradually tapering narrower to where it joins it. Receivers also are made tubulated and stoppered in the same manner as retorts, the tubulure here being made so as to be uppermost when the apparatus is in use. They are also made quilled and tubulated, the quilling being a long, tapering tube situated opposite the tubulure, and used for drawing off the distillate as soon as produced. Other more complicated forms exist, but the advanced student would find them described in any text-book that indicated their use.

There is one disadvantage attending the use of glass retorts, and that is the "bumping" which occurs during ebullition, which with some liquids—such, for instance, as sulphuric acid—is so violent as sometimes to cause a fracture of the containing vessel. This bumping, which consists of violent disengagements of vapour at irregular intervals, may be partially prevented by the insertion of pieces of charcoal into the boiling fluid. For the acid just named pieces of platinum wire or clippings or pieces of rock crystal are considered the best means of prevention, though their action is not quite perfect.

For acting upon large quantities of material for manufacturing purposes a *still* and *worm* is most commonly used. The same form of apparatus is the one most frequently supplied for making distilled water with. The still is a vessel, constructed of various shapes, which takes the place of the retort, while for the receiver used as a condenser, as just detailed, is substituted a long tube coiled in the shape of a spiral, and termed a "worm." The still is provided with a head, which may be described as a hollow lid somewhat spherical in shape. From the top of the still-head rises a wide tube or arm bent at an angle like a retort. To use this apparatus the liquid to be distilled is put into the still; the still-head is then put on and tightly pressed down, and the arm connected securely with the upper opening of the worm, which is wholly immersed in a tub or bucket, through a hole near the bottom of which projects the lower end of the coil. The tub, to which the worm is usually permanently attached, is then filled with water. Heat being applied to the still the vapour has to pass through every convolution of the coiled tube or worm, which is kept continually cool by the surrounding water, and, being thus robbed of its heat, is again converted into liquid and trickles out of the worm end in a continuous stream into a vessel placed to receive it. The worm-tub water will soon get heated, and must be drawn off by a tap at the top where the heated water lies, the lower portion being quite cold, and it must be made up by fresh cold water introduced at the bottom by a funnel with a long neck.

In using this form of still for producing distilled water either gas or an ordinary kitchen or parlour fire can be used. It will be all the better if the head be attached to the still by means of a water jacket—a sort of double joint to prevent the escape of steam. When once set in action further supplies of water to make up for that which is being converted into steam may be introduced through an extra opening with which the top of the still is supplied. Though it is not so made in all stills this opening, to be most efficient, should be supplied with a tube reaching to within a short distance from the bottom, and serving the double purpose of supplying fresh cold liquid in the proper place (the bottom) and acting as a warning when the still is nearly empty by permitting a rapid escape of steam. When using water for distilling it is always necessary to reject the first portion which comes over and to see that it does not evaporate to partial or complete dryness. This rejection is easily done when the apparatus is first set in action; but when a second quantity is put into the still it is to some extent inconvenient to remove the receiving vessel and wait till a sufficiency is passed through and rejected. If, however, the water be boiled for some time in a separate vessel, and added to the still when necessary, much time and trouble will be avoided. The water in the still should on no account be boiled violently, as particles of it would be spirted up with the steam and carried into the worm, where they would mix with and so spoil the properly-distilled portion. This carrying up of particles of water will occur to a far greater extent than the tyro would imagine, and must always be guarded against. A form of still-head much to be recommended, and which consists of a globe attached by a neck to a lid, has been devised to remedy this to some extent. The spirted drops impinging against the sides of the globe are arrested and flow back into the still.

To obtain thoroughly-pure distilled water some attention should be paid to what is put into the still. If it be rain water it will contain ammonia and its carbonate, and should have a little sulphuric acid added to prevent ammonia distilling over; while spring or river water, containing chloride of magnesium, should be mixed with a little lime to ensure freedom from hydrochloric acid in the distillate. The worm and tub are frequently replaced by other contrivances, a very neat and favourite form being that popularly known as "Liebig's condenser," which consists of a straight, tapering glass tube, enclosed or surrounded by a cylinder or jacket of tin plate or copper (on a very small scale glass is used for both tubes), which is tapered at each end so as to clip water-tight the inner glass tube, leaving an inch or two of it projecting at each end; or, instead of the jacket being tapered, it may be supplied with two discs of cork, through the centre of which the tube is passed. It is often provided with a leg at each end to support it in position, the one nearest the narrow end of the glass tube being the shortest, in order to give a downward slope to the condenser, that the distilled water, as it is produced, may trickle to the narrow end. Also, a funnel—fixed through the top at the same end, and its neck reaching almost to the under side of the condenser—is permanently fixed; while at the the opposite end, at the top also, is fixed a tube which, rising perpendicularly for about an inch, is bent and turned over to point downwards.

In using this condenser water is poured in through the funnel till it begins to run out of the bent tube, and as often as is necessary the heated water is replaced by pouring cold in, which, owing to the arrangement described, does not mix with the hot, but simply pushes it forward through the exit tube. This condenser is made in all sizes, that capable of distilling two or three gallons daily being generally kept in stock by dealers in chemical apparatus. It was originally designed for the distillation of very volatile liquids, to prevent any portion being carried over by spirting. The retort being elevated so that the beak points obliquely *upwards*, and the connection with the condenser slanting in the opposite direction made by a piece of bent tube inserted into a cork at each end, all drops that spirt up fall down by their own gravity, or are caught by some portion of the retort.

There is yet another form of condenser which is used on both large and small scales, and acts more rapidly than any yet named. The cold water passes through a wide tube or cylinder, which is placed within another still wider, surrounded by water and provided with suitable means for renewing the supply of cold water, while the steam is conveyed into the space between the two cylinders. The surface exposed to the vapour is so large that condensation takes place instantly with even a very large body of steam, and the apparatus is so constructed that it can readily be taken to pieces and cleaned—a very important consideration when great purity is required in all operations. For very corrosive liquids stills, heads, arms, worm, worm-tub, and, in fact, every part down to the taps, can be obtained in stoneware, which will resist almost everything in the shape of chemicals.

When the student for the first time fixes up his distilling apparatus he will experience some difficulties in fitting the various parts together. In fitting the retort to the condenser he may find the beak of the former too wide to go in. This is remedied by an adapter—a glass tube, straight or curved, made very wide at one end and narrow at the other. If this be not at hand, a cork fitted to the retort and another to the receiver, and a piece of glass tube running through each, will be equally efficient. He may find the apparatus, with the means of support he has at hand, to be too rigid, and liable to be strained. A junction made with a piece of india-rubber tubing will be his remedy. Owing to exigencies of room or peculiarities of situation in the heating arrangements he may find the retort or still will not reach the condenser. A connection must be made with an extra piece of glass tube of suitable length joined with the caoutchouc tube again, and all will work well. In all such connections, however, care must be taken that each piece forms a continuous descending slope; for if one interposed tube should be in the wrong direction, pointing up instead of down, the condensed vapour would gradually collect there, stopping the distillation, and ending in a slight bursting of connections from the pressure of steam.

Care must be taken in distilling to make all joints—of whatever description—secure and tight, or there will be a leakage and waste of vapour. This hint must suffice here, as the subject of connecting apparatus will be treated of in another chapter.

I will conclude this chapter by a description of a very effective and economical still I have seen in daily use. A common copper kettle, filled with water and set on the fire, was provided with an extra lid, into which was let two block-tin tubes—one (a short one) widened out slightly as a funnel, the other (longer) bent at a right angle. To the end of the latter was attached a short piece of india-rubber tube, which clipped a long piece of glass tube provided at its other extremity with another short length of india-rubber. This was attached with a tube and cork to a Liebeg's condenser, which was suspended against the wall by a piece of string and a couple of nails. An old pail to catch the heated condensing water, a jug to supply fresh cold water as required, and a large bottle under the end of the condensing tube, completed the arrangement.

G. Watmough Webster, F.C.S.

ON MAKING COMBINATION GROUPS.

[A communication to the South London Photographic Society.]

In compliance with the invitation of our esteemed Secretary I have to call attention to a method of making combination groups which is extensively practised in America. The plan is especially useful where a large number of figures are to form the group, and when it is only possible to obtain the photographs of the several members of the group by a number of sittings at various times.

In the first place, it will be necessary to make a sketch of the desired group, introducing the required number of figures. The positions of the latter and the general design of the group may be varied to any extent to suit the subjects, taking care that the figures are drawn in true perspective, the front figures being larger than those in the background and middle distance. A suitable landscape or interior background is then sketched or drawn in black, and on a grey board, leaving space for the figures, which are lightly sketched in their proper places. A separate sketch is now made of each figure on small square pieces of tracing-paper; these little tracings are numbered to correspond with the figures in the sketch.

The separate figure negatives are now taken in the camera, the small tracings being held behind the ground glass to give the correct size and position of the figure. A print on albumenised paper is next taken from each negative, and having been carefully cut out, the figures are arranged on the background, and a reduced negative of the whole taken in the camera of the size required.

Some little care and skill are requisite to avoid showing the joinings. It will be found a good plan to bevel the edges of the prints from the back with a sharp knife. It will also be necessary for the foreground figure to be printed vigorously, those further back being printed more lightly, and sunned or toned down before being fixed.

Any little defect may be remedied or addition made with the brush on the finished picture. By this method groups of any number of figures may, with a little care and skill, be made in a very satisfactory manner. B. J. Edwards.

RESIDUES.

Allow me a little space to reply to Mr. W. H. Davies's comments on my notes on the recovery of silver from residues in his interesting paper read before the Edinburgh Photographic Society at its last meeting, also to your correspondent "Refiner."

Our friend Mr. Davies joins issue with me on the method of precipitating the silver from the old hyposulphite solutions. He says that his plan is to run the solution into a tank lined with zinc; the silver is then precipitated automatically by the action of the zinc, and will only require an occasional stir to bring fresh portions of the fluid in contact with it, and a scrub now and then to keep the zinc in good working condition.

Now, I cannot help thinking that this plan, simple though it seems, is not a profitable one, being based on the destruction of the vessel containing the solution to be acted upon, as we know that for each ounce of silver thrown down a certain quantity of zinc must be dissolved; and the fact that Mr. Davies's tank has been in use for ten years rather causes me to doubt that he has recovered the whole of his silver, unless he operates on a small scale. If the zinc process be adopted it will, I think, be found much better to run the hypo. solution into a wooden or earthen vessel, and to suspend in it a bundle of zinc cuttings, which may be purchased at the zinc-worker's at a few pence per pound. At page 447 I stated my objection to the zinc process as being very slow and uncertain when the temperature is low, so that care should be taken not to run off the solution before testing it during the cold winter months.

Another objection I have to this method is that the silver so precipitated always contains a quantity of zinc, which proves a great nuisance in the crucible, forming a large quantity of slag and preventing the silver running down freely, thereby causing a certain amount of loss. Those, however, who prefer that method will do well to digest the precipitate in dilute hydrochloric acid, and wash it free from zinc before drying it. The little extra trouble involved in doing this will be amply compensated for.

Your correspondent "Refiner" asks, in a recent issue, if it be not impossible to obtain *pure* nitrate of silver without having recourse to the furnace. He says that it has been found that the crystals of nitrate made from silver obtained from the chloride by the wet method contain some undecomposed chloride. In my own practice I have never found this to be the case, but I have always allowed plenty of time to elapse, so that the action of the zinc should be *complete*, and have not stopped it when it simply appeared to be so. I do not, however, see that the presence of a minute trace of chloride in the crystals is of any consequence to the photographer, as, of course, it will be removed by filtering the solution.

With regard to the organic matter which, he says, is contained in the crystals, I may say that I have made scores of baths with nitrate obtained from residues by the wet method, at a time when simply iodised collodion and pyrogallic acid developer was used, and when the absence of organic matter in the bath was of far more importance than at the present time when bromo-iodised collodion and iron developer are employed, and I have never experienced any inconvenience from its presence. In fact, such nitrate was always reserved for the making of baths in preference to the commercial article.

If, however, from carelessness or other cause there should be a little organic matter present it may easily be got rid of by sunning the solution, as is now done by many operators with all new baths before using them. The presence of a small quantity of chloride may then be of some advantage in assisting the precipitation of it.

If it should be considered desirable to fuse the silver before dissolving in the nitric acid—although I do not see the necessity for doing so—so as to *ensure* the freedom from organic matter and chloride, it may easily be accomplished *without a furnace*. Most of us remember in our schoolboy days having read in conjuring books how to melt a sixpence in a walnut shell by filling the shell with a mixture of saltpetre, charcoal, and sulphur, placing the coin on the top of it, and setting fire to the mixture, the heat evolved by its combustion being sufficient to fuse the coin. By similar means we may fuse our silver, which, after being washed as directed at page 499, should be dried. Then make a mixture known as "Baume's flux," consisting of—

Powdered nitrate of potash (saltpetre)	6 parts.
Charcoal or *fine* sawdust	2 ,,
Flowers of sulphur	1 part.

Now take a conical clay crucible and put a layer of the flux, about two inches deep, at the bottom of it, and on this put a layer of the dried silver powder and another layer of flux, and so on in alternate layers until the pot is full; the whole should then be pressed down tight and some more flux put on the top. The quantity of flux required is about four parts, by weight, to each part of silver to be fused. The larger the quantity to be operated on the smaller is the proportion of flux required. The crucible should now be placed on the hob of a stove, or, better, in the open air, and the contents ignited, which will burn with intense heat. After the combustion is complete and the pot cooled the metal will be found in the form of a button at the bottom. The success of the proceeding depends on having all the materials thoroughly dry. E. W. Foxlee.

WASHED EMULSION PROCESS.

[A communication to the Liverpool Amateur Photographic Association.]

The following are the details of the method I have adopted in working the modification of the emulsion process suggested by Mr. W. B. Bolton, whereby washing and the use of a preservative are dispensed with—a rough outline of which I gave you at our last meeting.

Prepare a plain collodion of five grains of powdery pyroxyline to the ounce of mixed solvents, and allow it to settle for at least a week; carefully decant the required quantity, and add to each ounce seven grains of bromide of ammonium, finely ground in a little alcohol (this grinding is necessary, as the salt is but sparingly soluble in alcohol); well shake at intervals for about three hours; then add for each ounce fourteen grains of nitrate of silver dissolved in the usual way in a little distilled water and hot alcohol. The proper equivalent of silver for seven grains of bromide of ammonium (the equivalent of that salt being ninety-eight) is a trifle under twelve grains. It is, however, desirable to have an excess to ensure the action of the silver on the pyroxyline. Agitate well for at least a couple of hours, and filter the emulsion into a dish set perfectly level; allow the emulsion to remain until it is thoroughly set, the time, of course, varying with the quantity used, the size of the dish, and the temperature. It should remain until it is capable of bearing a moderate pressure of the finger without breaking. When set break up the film with a broad strip of glass, and wash slightly with distilled water. Transfer the film into a wide-mouthed jar, and well wash with many changes of ordinary water, breaking up the film into small pieces to ensure the *thorough* removal of all soluble salts. When this has been accomplished, and the water comes off clear, decant or draw off as much of the water as practicable, and wash again in three or four changes of alcohol; the latter having a strong affinity for water sucks it out of the broken film. Finally, dissolve in a mixture of ether and alcohol.

The alcohol used for washing need not be wasted; it can be ltered back for future use. The alcohol used for final solution ad better be absolute, to counteract the effect of any water left n the film. Ten ounces of plain collodion treated in this manner vill yield about twelve ounces of finished emulsion. I do not add annin or any other organic matter to the emulsion. If an ammoium salt be used in the collodion any amount of intensity can be btained with the alkaline developer, and there is nothing to gain in his direction by organifiers. In the experiments I have made I lways found that the plain emulsion yielded better negatives than an organified one.

There is every reason to believe that an emulsion so prepared possesses indefinite keeping qualities. The negatives I have here to-night were taken by an emulsion prepared in the manner I have described on the 12th of August last; the plates were prepared, exposed, and developed two or three days since. The emulsion is quite as good as when first prepared.

To prepare the plates, albumenise with dilute albumen (one to twenty of water), back with burnt sienna, and, when thoroughly dry, coat with the emulsion and set up to dry. The drying may be by heat or spontaneous; it makes little matter which method is adopted. The exposure is decidedly rapid. With a Ross's medium-angle doublet of seven inches equivalent focus, largest stop, and well-lighted landscape, thirty seconds will be about the exposure. However, great latitude is allowable; for, by the method of preliminary treatment with pyro., it is possible to judge of the correctness or otherwise of the exposure with great accuracy before the real development begins.

To develope, pour over the film undiluted alcohol of average strength, wash well, and pour over a four-grain solution of pyro. (see that there is no trace of alkali in it). Now carefully watch the plate. If properly exposed the high lights and the secondary lights will appear in about half-a-minute. A very little experience will soon enable the operator to judge as to the exposure, and adapt his developer accordingly. Assuming the exposure has been correct, to a three-grain solution of pyro. add one minim of a ten-grain solution of bromide of potassium and one minim dilute ammonia (one part of ammonia to eight of distilled water). Treat the plate with this until its power seems exhausted, then add another drop of the ammonia solution, then a drop of bromide and a drop of ammonia until the details are all out and the plate sufficiently intense, no large addition of ammonia being made without bromide to check it. The first application of the alkaline developer must have a trace of bromide, or fog will ensue (see also an excellent method described in THE BRITISH JOURNAL OF PHOTOGRAPHY for July 17). If by the preliminary development the plate appear to be under-exposed use the strong alkaline developer, but be cautious not to push it too far or the image may be over-intensified. If over-exposed use an excess of bromide and very little ammonia, and, if necessary, intensify with acid silver; or, if much over-exposed, push the development with the plain pyro. until all the details are out, and intensify with acid silver, without using the alkaline developer at all. Intensification with silver will rarely be needed unless the plate be over-exposed; if it be, however, necessary, use it before the film is allowed to dry. The plates are also capable of being developed with iron, a wash of a nitrate of silver solution being applied before the developer is used. Fix with hypo. in the usual manner.

The numerous advantages of the process to a dry-plate worker, to amateurs especially, are so patent that any comment by me is unnecessary. I would only observe that, from the very nature of the process, it possesses in an extraordinary degree that quality which, of all others, is so essential in a dry process, namely, uniformity and certainty of result. I trust that others may be induced to experiment and make known their experience, with a view of rendering the process as perfect as possible. EDMUND PHIPPS.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

THE cause of the bad effect of ammonia fuming upon the varnish of the negative, to which reference has been made by Mr. Russell Sedgfield, is not difficult to explain. It is well known that many of the negative varnishes now in use contain a large proportion of shellac; and it is further well known that shellac is rapidly acted upon by ammoniacal fumes. Sandarac is not affected in a similar manner, so far as my experience goes; while, as the basis of a good, hard, and tough varnish, it is not inferior to lac. When used alone it is too hard and brittle; but by the judicious admixture of castor oil an efficient remedy is provided for these qualities. Ammonia fuming is much more adopted in America that in this country, and I never heard of a complaint there about the deterioration of the negatives from this cause, the fact being that gum resins other than shellac form the chief ingredients in the negative varnishes used in the United States.

As I foresaw, the awarding of the Crawshay prizes has again given rise to some amount of dissatisfaction, although, perhaps, not of astonishment. In offering these prizes Mr. Crawshay doubtless meant well, but beyond a slight pecuniary benefit to a few, it would be the height of folly to say that any other good has resulted from such awards, unless it be the proof, beyond all manner of doubt, that the production of direct large heads is a mistake. From the fact that the leading landscape photographers have held aloof from competition for Mr. Crawshay's prizes for landscapes, although exhibiting their works under the same roof and at the same time, Mr. Crawshay will now probably realise the fact that his pecuniary awards, although certainly offered with the best intentions, are not appreciated and not desired by an important class among our leading photographers. It is, therefore, a pity that he had not been advised to discontinue prizes given out of the plenitude of his pecuniary resources, and unquestionably out of the goodness of his disposition, but which, as must now be apparent to him as well as to all others, was a mistaken and misplaced largess, resulting only in unpleasantness not altogether free from "envy, hatred, and all uncharitableness."

I have read in the *Foreign Notes and News*, in this Journal of October 16th, what is termed the "outline of the dry process of M. Roselle." Now, if there was one process better known than another several years ago it was the honey process of Mr. Shadbolt. I therefore consider that I have a right to ask our Editors how they got into such a state of somnolence as to have given publicity, without protest, to such a barefaced re-hash of the Shadbolt honey process as the *new* process of M. Roselle? As the method stands at present recorded in your pages it is identical with that of Shadbolt; if some distinctive feature has been omitted why, then, was it omitted by the writer of the *Notes?*

The annual exhibition of the Photographic Society has once more been held, and ere this reaches the eye of the reader will have become a thing of the past. On the whole the display was, I think, much better than might have been expected, considering the previous state of internal dissension in the Society, even if not quite up to the average of former years. "The least said is soonest mended;" hence I will only say that the 1874 exhibition will not have left its mark upon the record of photographic progress.

I observe that the subject of supplementary exposures is again being brought up for discussion. Let it not for a moment be imagined that the accession of light to the plate other than that which radiates directly from the object on to it is a novel idea. I present the following brief extract from an old treatise on the daguerreotype, by M. Humphrey, which was published in 1853:—"It is a fact not generally known that a plate coated in a light chemical room is more sensitive than when coated in darkness. By admitting a free, uniform light, and exposing the plate to it a few seconds after coating, then timing short in the camera, a very light, clear impression is obtained. The time in the camera is reduced in proportion to the previous action of light. The shades, of course, are destroyed, and the tone injured; still, for taking children we have succeeded better by this method than by the use of sensitives. The discovery of this principle was accidental while operating where the direct rays of the sun, entering the window just before sunset, fell on the curtain of our dark room, rendering it very light within."

Wanted to know—In what consists the alleged superiority of the daguerreotype process over the positive collodion process as a means of recording phenomena connected either with solar or astral physics or anything else? Having access to exceedingly sharp daguerreotypes, and also to exceedingly sharp collodiotypes, I unhesitatingly affirm, from an intimate acquaintance with both, that one is quite as good as the other—both being taken with an equal amount of skill. I think, therefore, that it is a retrogressive movement which is being attempted to be made by those French scientists who would strive to have the daguerreotype process employed instead of collodion in the application of photography to astronomical purposes, and, among others, to the transit of Venus. A collodion positive is quite as sharp as a daguerreotype, the gradation of tones is quite as good, it bears enlargement quite as well, while it is very much more easily made. Why, then, attempt to disinter an obsolete process, even although that process be replete with interest at every stage of the operation?

That the daguerreotype process *is* interesting I should indeed be sorry to deny. It is a process in which everything is dependent upon the *man* and nothing upon the chemicals, and, take it for all in all, we shall not look upon its like again. But let it lie! It has had its day.

[Owing to press of matter we are obliged to leave over some of these "Notes" till next week.]

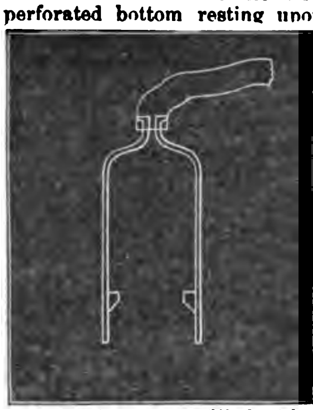
AN AUTOMATIC, ECONOMICAL, SIMPLE, AND THOROUGHLY EFFECTUAL APPARATUS FOR REDUCING SILVER WASTES TO THE SULPHIDE.

[A communication to the South London Photographic Society.]

For reducing silver wastes to the sulphide the advantages of sulphuretted hydrogen gas over sulphide of potassium are so well established that if a thoroughly satisfactory mode of using it were well known it would, in all probability, be universally employed. The delicate and complicated apparatus employed by the analytical chemist, from its expense and liability to injury, is unsuited to the uses of the photographer, yet from the reducing agent being ready at a moment's notice it has very great advantages.

Mr. Foxlee has recently published in The British Journal of Photography a very simple means of generating the gas for photographic purposes; but his apparatus has the disadvantage of liability to breakage, and requires some time to put it in action, and after its work is done as much time is required to make it cease its action. It is also liable to waste the offensive gas by leakage. The apparatus about to be described has the advantages of the costly generator without possessing the disadvantages of either machine.

It consists of a stoneware cylinder about seven inches in length and about three inches internal diameter, furnished with a movable, perforated bottom resting upon three shoulders placed about two inches from one end. The opposite end is closed to a small neck perforated with a hole about a quarter of an inch in diameter. To this neck is attached an india-rubber tube with a pinchcock close to the neck. The free end of the tube has a small piece of leaden pipe inserted into it to cause it to sink in the waste solution. The cylinder is filled to the shoulders with sulphide of iron in lumps about the size of a hazel nut, and the perforated bottom is then placed *in situ* to prevent the iron falling out. The charged cylinder is now placed in a suitable jar—say seven inches deep and six or seven inches diameter—and this jar is then filled with a solution of sulphuric acid one part and water eight parts. As long as the pinchcock is closed no action takes place; but the moment the pinchcock is opened the acid rises within the cylinder, and, acting upon the sulphide, immediately liberates sulphuretted hydrogen gas, which issues through the india-rubber tube. This action continues for any length of time until its action is no longer required, when, by closing the pinchcock, the gas stops flowing, and filling the cylinder expels the acid, which resumes its original position in the outer jar until it is again required, when at any moment a continuous supply of the gas can be obtained by simply opening the pinchcock.



Practically the photographer does not need the pinchcock, as when the gas is no longer required the cylinder can be lifted out of the jar, and both can be placed side by side in any convenient place. The action will immediately commence when the cylinder is replaced in the acid solution.

This automatic apparatus will be found inexpensive in its first cost, extremely economical in use, is ready at any moment either to commence or cease its action, is not likely to get out of order or to receive injury, gives no trouble whatever, and thoroughly answers the purpose for which it is intended.

Lead may be used instead of stoneware, and a common gas tap may be soldered into the neck; but stoneware is preferable. If any one find a difficulty in procuring this apparatus I shall be happy to supply a few similar to my own.

W. T. Bashford.

FOREIGN NOTES AND NEWS.

Dr. Candèze's Scenograph.—M. Davanne on the Dry Process.

In an amusing article, signed "G. D. V."—no doubt by M. De Vylder, President of the Photographic Association of Belgium—in the *Bulletin* of that Association, we have an account of a new pocket camera invented by Dr. Candèze, of Liège, and called by him a "scenograph." It is intended for single pictures of the half-plate size, or for a pair of stereoscopic views upon a half-plate. Its sides are flexible, so that the camera can be carried in one coat pocket, and a couple of dark slides, each containing a pair of plates, in the other pocket. A walking-stick tripod completes the outfit. The sensitive plates are, of course, supposed to be dry ones; for our author tells us that "wet collodion, in spite of its incontestable advantages, has so many inconveniences that it must yield the palm to the dry process for all photographic excursions made by an amateur." He combats also very amusingly the objection that dry plates are so slow by reminding us that during the exposure we may gossip with a friend, smoke a cigarette, enjoy the scenery, choose other points of view, &c.; and then with respect to the negative turning out well when developed at home, if we cannot absolutely see the result on the spot, still we may feel assured that there are a hundred chances to one against its proving a failure when developed at home, if we only use proper care in the various stages of the manipulation. But this development of the plate the same day, in the evening when one is tired, in one's room at the hotel—is it not a sad bore? "No, indeed," we are told; "it is a veritable pleasure, and quite a climax to the enjoyments of the day!" With respect to the instrument itself, the lens, we had almost forgotten to say, will require to be put into a third pocket; and as for the dark slide no focussing is required, and it may be dispensed with altogether if the operator will but furnish the top of his camera with sights, and make his brains do the work of his eyes in adapting the image to the boundaries of his plate.

Every inventor may be excused a little enthusiasm when exhibiting his bantling to the world, and we must not criticise too severely the remark of the worthy doctor, in the preface to his *brochure*, in which he tells us that he looks forward confidently to the time when every tourist will be a photographer, and will carry in his coat pockets, on his excursions, the scenograph and dark plates, and in his hand the walking-stick tripod. But even supposing that every man is *not* his own photographer, still, we are told, dry plates can be purchased ready prepared, and those who prepare them will also be happy to develope them for their customers when the image has been impressed. It appears therefore, from every point of view, that the scenograph must one day become an indispensable article of luggage, and a never-ending sourceof enjoyment to him who has the good fortune to possess it.

M. Davanne has been delivering a lecture lately on the dry processes at the "Ecole des Ponts et Chaussées," in which he made the following remarks:—

"It is easy to work with wet collodion in a dark room surrounded with every convenience, but far otherwise when you are *en route*. Although many kinds of portable tent and laboratory have been devised, yet these constitute heavy luggage, and from the very first it has been an object to simplify all this encumbrance by discovering a good method of preparing dry plates. Numerous processes of this kind have been devised; but the two in common use, and which give the best results, are the Taupenôt and the tannin processes. The points of departure in all of them is the same, viz., to prepare a film of iodide and bromide of silver in a medium permeable and insoluble. But, whatever that medium may be, when the film gets dry the nitrate of silver in it becomes concentrated and reacts upon the insoluble salts of silver so as to form crystals of iodo-nitrate, which completely destroy the sensitive surface. Besides which the free nitrate of silver reacts upon the organic matter in the sensitive film, alters it, and renders impossible the development of a good negative. The first condition of success is, therefore, to wash out of the film all the free nitrate of silver, but the first result of this is to reduce considerably its sensitiveness. Thus, until now, all known dry processes remain a little less sensitive than the wet process, although great progress has been made in this direction. A second condition is to maintain the permeability of the film, and for this reason it is impossible to make use of an ordinary collodion film simply washed, because this, in drying upon the glass, would lose its spongy texture and become changed into a film impermeable to liquids, in which condition it would only give a superficial image devoid of vigour, because the developer could not penetrate into the interior of the film. On the other hand, a very old and altered collodion, or one made with a powdery pyroxyline of bad quality, gives a film disintegrated and more permeable to the reagents, but the proofs which it gives when dry, after a simple washing, are inferior to those which can be obtained in the following way, viz., to fill the pores of the collodion film with a substance soluble or permeable, which can be penetrated or replaced by the developing-agents. The number of such substances appears to be unlimited, and to include all gummy, gelatinous, albumenous, sugary, and deliquescent substances, which have no secondary action upon the sensitive film. Thus milk, beer, alcoholic wines charged with tannin, different syrups, sugar, glucose, tea, coffee, tannin, gallic and pyrogallic acids, albumen, gelatine, caseine, deliquescent salts,

&c., have been tried, and from a multitude of these trials we seem to learn that the best results are obtained with albumenous matters of which the type is the white of egg, and with matters containing astringent principles analogous to tannin, such as tannin itself, gallic and pyrogallic acids, tea, coffee, &c."

Such, according to the leading French photographic chemist, are the principles which should guide us in the preparation of dry plates.

PHOTOGRAPHIC IRRADIATION.

Mr. A. Cowper Ranyard, dating from Florence, says, in a recent number of our contemporary, *Nature*:—I shall be obliged if you will allow me space to state more specifically why I am not able to concur in the irradiation theory of Mr. Aitken. I understand from his last letter that he fully agrees with Lord Lindsay and myself as to the cause of the outer irradiation, and our only difference of opinion now lies in the amount of the inner irradiation that can be traced as due to what he has termed *molecular reflection* within the thickness of the collodion film. Mr. Aitken and Captain Abney both appear to consider this as the chief cause of the inner irradiation fringe, while I am disposed to rank the irradiation arising from the optical imperfections of the instrument with which the photograph is taken, together with any irradiation that may arise in the wet-plate processes from circulation in the film of fluid covering the plate, before, or as very much greater in amount than the irradiation due to dispersion within the collodion film.

We should expect that light dispersed within the thickness of the collodion film would produce its photographic effect in all directions round the illuminated point, and that the area of action would not be affected, or certainly would not be decreased, by covering the front surface of the portions of the collodion film adjacent to the directly illuminated area with an opaque object. Indeed, if the opaque object were a good reflector, such as a bright piece of platinum foil, we might expect slightly to increase the area of photographic action due to dispersion within the film; for the light dispersed towards the front surface of the film would be in great measure reflected back into the thickness of the collodion. But, as I have shown in former letters, placing a piece of platinum foil in immediate contact with the collodion film causes the photographic image of a bright image to be sharply cut off, and no perceptible irradiation can be traced under the edge of the foil.

Again: we should expect the action of dispersed light to extend further within a thick film of collodion than within a thin film; for there would be a greater thickness of illuminated collodion, and the angle through which light could be radiated directly upon the adjacent area without suffering reflection at either surface would be increased, but I have not been able to detect any preceptible difference in the amount of irradiation of similarly-exposed plates coated with four thicknesses of collodion and in those coated with but one film.

I have felt myself, therefore, driven to look for the cause of irradiation either in some circulation taking place within the film of liquid covering the collodion at the time of exposure, which film would be interrupted and its tension greatly altered by the contact of a solid body; or else to seek its explanation in the optical imperfections of the photographic instrument. Possibly, in the wet-plate processes, circulation within the fluid film may produce a very sensible effect. Indeed, there are phenomena which make this more than probable. When a wet-plate picture of a strong light projected upon a dark background is taken with a decided over-exposure of say ten minutes or a quarter of an hour, the inner irradiation fringe is seen to be most opaque on its outer edge; and the phenomenon is so marked that it cannot be held to be an effect of contrast. This, of course, should not be the case if the irradiation edge were due merely to the optical imperfections of the instrument.

Again: in the small negatives of the eclipse of December, 1871, taken at Dodabetta and Baikul, there is a decided structure in the irradiation under the prominences. Under the brightest of them it can be distinctly seen that the opacity of the irradiation fringe is greatest along lines radiating from the prominences; while along the outside—that is, furthest from the prominences—there is an arc of slightly greater intensity. The same structure is traceable in all the negatives; but it is most marked in the Baikul series, and especially in those negatives in which the prominences are most exposed, viz., on the east and west limbs, at the beginning and at the end of totality. This, of course, cannot be accounted for merely by the optical imperfection theory. Again: the little brushes mentioned in a former letter as extending under the edge of the platinum foil cannot be accounted for without supposing that there is circulation within the liquid film. I hope, on my return to England, to carry out some further experiments for determining the amount of the inner irradiation which in the wet-plate processes may be due to such circulation.

OPINIONS OF THE DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

The Photographic Society of Great Britain.—Even with this, the nineteenth annual exhibition of the Society fresh in one's recollection, we feel inclined to question whether the art, if it may not with more propriety be called the science, of photography is likely ever to become popular in that larger sense of the word which implies the favour of the people. It affords, indeed, occupation to a considerable number of ladies and gentlemen, to whose leisure hours amusement is more necessary than profit, and with this class, as we may gather from a list of the exhibitors in Suffolk-street, its popularity is undoubtedly on the increase. Popular, again, in one phase it is—that phase under which it was first introduced to public notice, and which lends itself only to the reproduction of the human face and form. To give and to receive *cartes de visite* is a favourite amusement with young men and maidens in every walk of life. In the old days when portraiture was held as one of the fairest fields of the painter's art this was an amusement beyond the reach of all but the wealthy. Not every man could go to Corinth in the days of Reynolds, of Lawrence, or of Gainsborough, but now in these later times the pencil of that more truthful, if less pleasing, artist, the Sun, is at the command of all, and where, from cottage to castle, may not be found some specimen of his handiwork? There is a charm, too, we admit, in the recollection of some happy time passed far away from the common places of our daily life which this art can keep green for us. A broken statue or moss-grown ruin, castled crag or village inn—each and all may recal some memory which we would not willingly let die, while so far now has the photographer advanced on his onward path that the critic can enjoy equally with the traveller, nor need the pride of the eye be lost in the pleasures of memory. But photographs, we fancy, are never likely to become popular with that large section of the community who go to see pictures much as they go to the opera or to the park—because their neighbours go. In the first place they lack colour—that is, colour in the broad acceptance of the term, and colour with these people covers a multitude of sins; even the most ignorant, to whom light and shade, perspective and drawing, and all the *argot* of the studio are but words and nothing more, can recognise the beauty of colour. Then, again, photographs *en masse* are, from the smallness and delicacy of their treatment, somewhat wearisome to those who are unable or careless to appreciate such subtleties; and, lastly, the chief charm of photography lies, as we have said before, in a previous knowledge of the subject, not always to be found among those who visit picture-galleries at this season of the year. But, with all this allowed, we advise all who can to devote at least some portion of these shortening days to a walk round the Society's rooms. There are to be found in them all manner of subjects taken by every process of photography known to man.

Portraiture, of course, is well represented, and well-known faces look down upon you at every step you take. From loyalty, if from no other motive, we may mention first an autotype enlargement of a *Portrait of His Royal Highness the Duke of Edinburgh* (70), from the studio of Messrs. Spencer, Sawyer, Bird and Co.; *Mr. John Millais, R.A.* (65), *Miss Wallis as Amy Robsart* (47), and *Miss Neilson* (17) are also there, in the same style and from the same hands. The fidelity of the likeness cannot be gainsayed; but whether that style of treatment is a pleasant one is, we think, a question which admits of more argument. At any rate, if we must have it, we prefer it when applied to inaminate objects as *The Thames near Maidenhead* (62), *Ely Cathedral* (53), and the *Trout Stream* (219), all of which, and more especially the last, we are inclined to place above the portraits of the same artists. Mrs. Cameron sends twelve contributions, most, if indeed not all, of them portraits. This lady has deservedly attained a high reputation in her art, but we hardly fancy that the best specimens of her work are to be seen in Suffolk-street. Of the twelve we like best a pretty picture of a little child praying at its mother's knee for the father's safe return (202). *Kiss Me, Mamma!* (204), a *Portrait of Lady Hood and Her Daughter Mabel* is also pleasing; but Miss Isabel Bateman does not appear to advantage either as *Urania* (182) or *Queen Henrietta Maria with her Children* (203). To the former is appended a quotation from *In Memoriam*—"Urania speaks with darkened brow;" and the aptness of the quotation cannot be denied, for the brow of Urania is so remarkably dark that it is with difficulty we can separate it from the background of flowing hair and the overhanging boughs beneath which Urania stands. Distinctness is surely one of the first essentials in a photograph. In large breadths of landscape and composition pictures this is a quality undoubtedly difficult of attainment with the camera; but we confess we should not be inclined to allow this excuse to portraiture. The colour in which photography appeals to the eye is hot in itself pleasing, though, of course, this is far less apparent in some instances than in others; but when to this unavoidable defect is added a slovenliness of execution, whether from accident or design, then, we submit, the photograph is lacking in one of the first requisites of good photography. There is apparently a growing tendency towards this style of work among amateurs which we fail to notice among their professional brethren, and it is on this hint we venture to speak. Three children's heads in one frame (330) from the same lady, though graceful in pose and in expression, are open, but in a less degree, to the same objection.

Of all the portraits which have taken prizes in the Crawshay competition we like *The Gamekeeper at Home* (332), by Robert Crawshay, best, though the judges have only awarded it a second prize. Passing to the landscapes, we find that our space will not allow us to say all that might be said on this head. They are as good as they are numerous, and though, where all are so good, comparisons might be spared, few will, we think, be disposed to deny the palm to Colonel Stuart Wortley. It is almost impossible to imagine photography carried to a higher pitch of perfection than in this gentleman's view of *Carnarvon Castle* (97), by the new uranium dry process, as the catalogue tells us. It has all the softness of a water-colour drawing, and, indeed, almost the colour, while the sky is as a sky of Turner's. *The Hill Side* (98) and *The Seiont River at Low Water* (99) are good too, but not so good as this. Mr. Vernon Heath has two bits of Welsh scenery (79 and 80), and a view of *Warnham Court* (89), which fully keep up the reputation he has won. Mr. Bedford sends twelve charming little bits (20 to 31), of which we like the Welsh views best; and the *Declining Day* (271) of Messrs. Robinson and Cherrill might well have won the Crawshay prize without its two companion pictures, *Repose* (276) and *Under the Greenwood Tree* (277), to help it. Mr. Sanderson also takes a prize with a *View at Aberglaslyn* (287), and Mr. Nicholson's *Valley and Pond of Bonchurch* (296) certainly deserves another. From the coast of Jersey Mr. Reuben Mitchell gives us some wonderful effects of threatening sky and sunset in 308 and 810; but the finest example of this most difficult study comes from Mr. G. Stodart, who in one frame gives us four instantaneous views taken at Margate (385-388), which are perhaps the most wonderful specimens of the photographer's art in the exhibition. In one especially, where the moon, breaking through a bank of angry clouds, shines down on a quiet sea, which scarcely ripples round the timbers of the pier, the effect is rather that of an etching than a photograph. Nor must we forget to mention a series of Indian views (417-448) from Colonel H. Dixon, which are even more soft and clear than the generality of photographs taken by the Indian sun. *A Dead Stag* (375), by Captain Horatio Ross, and a frame full of *Odd Dogs* (136), some of them very odd dogs indeed, by Messrs. Jabez and Alfred Hughes, will claim most attention from the lover of animal life. We have by no means exhausted our list of noteworthy objects; but we have, we trust, said enough to induce our readers to go to Suffolk-street and form an opinion for themselves.—*The Times.*

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The annual Technical Exhibition meeting of this Society was held in the Cambridge Hall, Newman-street, on Thursday evening, the 29th ult. There was a large attendance, a preponderance of those present being photographers from a distance. The chair was occupied by the Rev. F. F. Statham, M.A., F.G.S., President of the Society.

After the reading of the minutes of the previous meeting by the Secretary—who adverted specially to the hospitable entertainment given by the President to the members during the summer recess, and also to the invitation extended by Mr. S. Fry to the members to visit his new studio at Surbiton—the following new members were elected, viz., Messrs. M. P. Tench, Heavyside, C. A. Ferneley, Prestwich, Tancioni, J. M. Nisbet, and Leon Warnerke.

Mr. W. T. Bashford, of Portobello, Edinburgh, submitted for exhibition a piece of apparatus for effecting the reduction of silver wastes. A short paper, descriptive of the mode proposed by Mr. Bashford, will be found at page 534. The stoneware bottle described in the paper was exhibited, and Mr. Jabez Hughes briefly showed its action.

Mr. Sebastian Davis said that as the liberation of sulphuretted hydrogen went on for a short time after the withdrawal of the acid liquor from the sulphide of iron, it would be necessary to have a larger space in the vessel below the shelf upon which the sulphide of iron was to lie. By making the base of the bottle deeper the additional gas generated would not escape into the atmosphere.

The Chairman suggested the necessity for making the bottle sufficiently heavy to prevent its toppling over.

Messrs. Oakley and Son, of Bermondsey, exhibited a camera-stand the nature of which may be inferred from the following particulars, which were read:—The top is triangular, and has three adjustable sliding legs held firmly by thumbscrews, which, by loosening, will allow the sliding legs to be set from the smallest possible adjustment or angle, and from three feet to five feet six inches high. By tightening the screws the stand is as firm when at its total height as when down (thus remedying the great fault in all other stands). Being so easy of adjustment it will be found just the stand needed for outdoor and indoor photography, exhibitions, &c. It is invaluable for taking interiors on stone pavements, as it can be made rigid by tightening the thumbscrews, and when once levelled it will remain so. It can be set to any height to suit the subject, and set level upon any uneven place—for instance, the side of a hill, roof of a house, &c. In fact, there are so many advantages that a momentary inspection of the stand will show that it is just the stand needed. A ball-and-socket joint is also fitted if required. Its advantages, in many instances, for photography, &c., will be seen at a glance. The top can be set and held by the screw under the triangle to any angle either way, or can be shifted round to follow up any passing object, &c., without moving the stand. It has been used for taking views of ships in motion, and also the animals in the Zoological Gardens. For the latter purpose it will be found of great service, as, the animals having to be taken just as they are in a state of rest or ease, the ball-and-socket arrangement will permit the camera to be shifted round as the animal moves from place to place, and, when a moment still, the photograph is taken. The ball and socket being constructed of boxwood and brass, and made to fit well, the camera cannot be shifted unless the screw underneath be loosened.

Mr. Jabez Hughes said that the camera-stand then exhibited was in reality one of the very earliest kind ever made—a circumstance of which the exhibitors were, doubtless, not aware.

Mr. Tully observed that he had been acquainted with it for at least ten years.

Mr. Samuel Fry exhibited a negative of the President of the Society, taken by him under the following circumstances:—The lens was a 5D, by Dallmeyer; the light being bad, he gave an exposure of forty seconds in the camera, having given it a preliminary exposure to diffused weak light for ten or fifteen seconds. Without this preliminary exposure he did not think he could have obtained a printing negative. Since the subject of pre-lighting and supplementary exposures had been discussed at the South London Photographic Society he had received several letters on the subject from photographers who had tried the system then advocated. Some had succeeded to their entire satisfaction, while others had not. He (Mr. Fry) spoke of the effects upon the face and figure of taking two negatives of the same person—one with a white and the other with a dark background—the exposure being similar in both cases.

Mr. Davis asked what ratio of reduction in the time of exposure was obtained.

Mr. Fry said the exposure was reduced to about one-half.

Mr. Hughes inquired if the reduction in the exposure was obtained at the expense of quality in the negative, or if there was any drawback whatever.

Mr. Fry said there was no drawback whatever, provided the pre-lighting was right. In reply to a question by Mr. Edwards, he (Mr. Fry) further said that in taking a large portrait with a very dark background, when the exposure, owing to feeble light or otherwise, would have to be a long one, it might be shortened by having an assistant to drop a white screen in front of the dark background for a short time.

Mr. J. R. Sawyer said that some months ago they carried out some experiments at Ealing with a view to ascertain whether a preliminary exposure was likely to be of use to them in the production of their large pictures, which required a very long exposure—from ten to twenty minutes. They thought it would be valuable in shortening this exposure, and probably also in setting up an action which would bring up the non-actinic parts of the picture; for he might add that, in copying pictures, they always preferred giving a very long exposure, which they found to be much better than a short one. After numerous trials with preliminary exposures of varying degrees of duration, the conclusion was forced upon them that while there was more or less fogging produced there was no real advantage whatever gained. He did not quite agree with Mr. Fry respecting the relative qualities of negatives taken with light and dark backgrounds. If two portraits were taken—one with a white and the other with a dark background—the latter would, in his opinion, possess better printing qualities thanthe former.

Mr. Fry quite agreed with Mr. Sawyer that in all cases when a very prolonged exposure was required pre-lighting would be of no use; it was only useful in the case of moderately-short exposures, such as were given to portraits.

Mr. V. Blanchard (after describing an experiment he had made at the suggestion of M. Adam-Salomon relating to photographing a light and a dark statue placed side by side) said that he last winter made some experiments with a supplementary exposure, and found that, while it was of no use in cases of very short exposure, it was most invaluable in the winter time, when, owing to the darkness, long exposures were required. It gave an immense power when operating with slow lenses. The operation lessened the greed of the negative for nitrate of silver. He spoke of the value of occasionally reflecting light upwards.

Mr. B. J. Edwards exhibited a number of transparencies made and used by him in the production of enlarged negatives, together with some prints from negatives thus obtained. He then read a brief communication on a method of producing large composition groups he had seen practised in America. He illustrated the paper by the exhibition of the drawings referred to in the paper, which will be found at page 532.

Mr. J. Werge made some observations on the subject of introducing artistic effects in plain backgrounds, and exhibited some pictures which had been treated in the manner described. Having recently published the full details of Mr. Werge's method, we shall not here recapitulate the descriptive particulars given by that gentleman. Mr. Werge also exhibited a portrait camera fitted with an internal secret shutter for capping the lens, by which a portrait could be taken unknown to the sitter.

Mr. Hughes called special attention to the usefulness of the shutter. He had been in the habit of using one of that sort, although slightly different and improved in construction, for twelve years. Its great usefulness consisted in not permitting the sitter to become aware when the exposure began or terminated. With a band under the dark cloth, the exact moment was seized when the expression was natural, and the dreadful "photographic face" which was frequently put on by sitters upon their observing the cap being removed was avoided.

Mr. Werge also exhibited a Weston's rotary burnisher, a new filter, and a dropping-bottle.

Mr. Hunter introduced to the notice of the meeting a plate-box, of which a description has already been given in this Journal.

Mr. H. J. Burton exhibited a collodion filter, a flat bath of peculiar construction, and a method of securing blotting-paper in the corners of inner camera slide frames. These will be found described in another page. Mr. Sawyer gave a description of these exhibits.

Mr. Harrison (one of the patentees of the pantascopic camera) exhibited a very ingenious contrivance for extemporising a developing tray or paper dish, to which we have drawn attention elsewhere.

Mr. Davis called attention to the great value of such a dish for developing dry plates.

Mr. F. Howard suggested the use of parchment paper when making it.

Mr. Blanchard said that a mixture of collodion and linseed oil was an excellent waterproofing material for the paper.

Mr. Cussons, of Southport, exhibited a developing-holder.

Mr. Miers, of Camberwell, showed a plate-box, the speciality of which consisted in the separating divisions between the grooves being composed of wire.

Mr. Attwood exhibited a printing-frame with ash bars and lancewood springs.

Mr. R. Kennett brought before the meeting several gelatino-pellicle negatives, and briefly spoke of the difficulties that were met with when working that process, giving hints by which they could be overcome.

Mr. Hughes then made a few observations, summing up the experience of the evening.

After a vote of thanks to all the gentlemen who had exhibited their inventions, and also to the Chairman for his able conduct that evening, the meeting terminated.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Tuesday, the 27th ult., at the Free Public Library, William Brown-street,—the Rev. H. J. Palmer, in the chair.

The minutes of the former meeting were read and passed.

The Chairman handed round a number of fine negatives with their corresponding prints. The negatives were by Mr. Penney, of Cheltenham, on plates prepared with Mr. Kennett's gelatine pellicle. They were excellent examples of the capabilities and rapidity of the gelatine process, most of them having been taken with an exposure of five seconds and under. He also handed round some negatives of his own preparation by the same process. He (the Chairman) had (owing to the effects of the ether in collodion on his health) determined to abandon its use, and, if possible, work only with the gelatine process. For some time he had met with nothing but failures, for which he could not account. He had, however, at last succeeded, and he could strongly recommend the process. One of the great causes of failure was that his plates were mostly fogged. He got rid of this by using two thicknesses of orange tissue-paper over his orange dark-room window. Spots on the film were another cause of failure. These were avoided by taking care, in returning the excess from the plate to the bottle, to pour it down the side of the bottle, and not to allow any bubbles to remain on the coated plate. In coating, the film ran more easily and lay more evenly by first breathing on the plate. Taking care to follow the directions given by Mr. Kennett with each packet of pellicle, and keeping down the light (for the plates are exceedingly sensitive) he felt sure that anyone with care could succeed with them.

Mr. J. H. Ellerbeck handed round some sheets of coloured gelatine, which he found very useful in using in addition to his usual dark-room glass.

Mr. Atkins exhibited a film negative, detached from the glass, and explained the advantages of being able to print from either side of the negative.

The Secretary read a letter from the President of the Belgian Photographic Association, and handed round the first and second numbers of the *Bulletin*, issued by that Association.

The Chairman said he was sure that the members would join with him in wishing success and prosperity to the new society which, he was glad to see, had been formed in Belgium to extend the popularity of their delightful art.

Mr. E. Phipps then read a paper on the *Washed Emulsion Process* [see page 532], and showed some exceedingly fine negatives in illustration of the process.

In the discussion which followed,

Mr. Phipps stated that he found the process was much more rapid than the ordinary bromide process. He usually allowed the plates to dry spontaneously. There was great latitude in exposure, and if it were found that too long an exposure had been given it was advantageous to let the bromide of potassium and pyro. developer soak well into the plate before adding the ammonia. It was also advisable, in case of redeveloping after the plates had been dried, to first moisten the plate with spirit to thoroughly soften the film. Reference having been made to the use of ammonium bromide, he (Mr. Phipps) stated that with cadmium he was not able to get sufficient printing density, and it was only when he began to use ammonium first in conjunction with cadmium—and subsequently alone—that he obtained anything like a good negative. He was confirmed in his opinion of the value of ammonium by observing that Mr. Stillman, in his published formulæ in his handbook for amateurs, used bromide of ammonium only, to the exclusion of cadmium.

The meeting was shortly afterwards adjourned.

Correspondence.

THE SENSITIVENESS OF IODIDE OF SILVER.

To the Editors.

Gentlemen,—I beg leave to offer a few words of reply to Mr. William Robinson's interesting communication, at page 493 of this Journal, on the subject of the sensitiveness of iodide of silver.

He may possibly be right in supposing that a washed iodide of silver film is as sensitive to light as one containing free nitrate—that is to say, as a common wet plate—and that the image upon such a film can be developed by the alkaline method when caustic potash is used instead of ammonia; and I may possibly be wrong in holding the opposite opinion as the result of numerous very careful experiments. But I would suggest to him, and to your readers, that his own experiments were not made with that scrupulous caution which questions of this sort seem to me to require. He confesses to having used a *bromo*-iodised collodion, and seems to suppose that the small comparative quantity of bromide which such a collodion contains would not sensibly affect the result. Here I beg to differ altogether from him. His collodion should have contained nothing but a soluble iodide, and his bath should never have had a *bromo*-iodised plate excited in it. Then, again, he removes the last trace of free nitrate by washing the film with a solution of common salt, thereby, of course, introducing some chloride of silver into it. All this, as it seems to me, is calculated to vitiate his results, and render his experiments inconclusive. When I was at Cambridge I used to hear it said that an astronomical observation which was not true to the tenth of a second was not worth anything; and what was true then in practical astronomy is equally true now in a similar way as regards minute accuracy in chemistry, and more particularly in photographic chemistry, where the quantities of material dealt with are so exceedingly small. I cannot, therefore, divest my mind of the conviction that his film owed its sensitiveness, and also its property of being developed by the alkaline method, to the traces of bromide and chloride of silver which it contained.

Then, again, I have never said that an image could not be obtained upon iodide of silver unless free nitrate was present, because I have been for years perfectly well aware that tannin and some other deoxidising agents will render iodide of silver capable of yielding a developable image after a very long exposure. What I have really said was that iodide of silver without free nitrate is comparatively so insensitive as to be practically useless for camera work with ordinary exposures.

Mr. Robinson's developer, composed of pyrogallol and caustic potash, restrained with iodide of potassium, is so far new to me that, although I have tried caustic potash as the alkali instead of ammonia, I have never used iodide of potassium as the restrainer. Caustic potash has appeared to me to be a very powerful alkali to employ; and I remember once having recommended, in a letter to this Journal, the use of carbonate of potash as a suitable alkali. It is quite possible that caustic potash restrained by iodide of potassium may make with pyrogallol an excellent alkaline developer, and I beg to thank Mr. Robinson for his suggestion.

In much of the remainder of his letter I heartily concur; but he must permit me to refer him to some articles of mine, which he says he has not yet read, in which I attempt to adduce several reasons, founded upon well-known facts, why iodine should be regarded as having a stronger affinity for silver than either bromine or chlorine has.

In conclusion: I beg to state that all those experiments of mine which I have described as having been made in reference to the theory of the latent image and the comparative sensitiveness of the haloid salts of silver may be relied on for the most scrupulous care in every detail, and for conscientious accuracy in my statements of the facts observed.—I am, yours, &c., Thomas Sutton, B.A.

October 31, 1874.

FUMING PAPER.

To the Editors.

Gentlemen,—From an article bearing the above heading, in your Journal of the 23rd ult., I find that Mr. Russell Sedgfield (on behalf of the profession) is desirous of being enlightened upon the use of fumed paper and its action upon the varnish of negatives.

Being a practical landscape photographer of ten years' practice in America, but now home upon a visit, I beg to state that during my experience I have never found any of the ills my brother photographer refers to, and cannot speak too highly of the use of fuming; for I have struck thousands of prints off the same negatives for the trade, and no visible change has taken place either in the varnish or negative.

Now it strikes me that many of my friends are running after the shadow in this fuming business, and that all the fault lies in the redeveloping of the negatives and the quality of varnish they use; for I found at a gallery in Broadway hundreds of negatives that were totally spoilt by intensifying with sulphuret of potassium, which not only rots the film and varnish, but gives a rough and coarse quality to the negative and print.

Now, if you fix, &c., &c., thoroughly wash, and use a varnish sold by every stockdealer in New York, known by the photographic name of "Anthony's flint varnish," you may use any amount of fuming and strike off any number of prints in perfect safety, and that in such a high temperature as we never experience in England. I have no doubt there are many varnishes in this country equal to the flint varnish.—I am, yours, &c., T. P. Smith.

November 3, 1874.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—Many letters have reached me, expressing a wish on the part of the writers, that this society should be formed immediately, and innumerable photographic friends have already made known their intention of becoming members, besides "certain influential gentlemen" who will bring substantial support with them. I hear that 150 photographers around this neighbourhood enjoy a prosperous existence, besides a host of amateurs who can help to run this photographic machine to the front rank.—I am, yours, &c., J. W. Gough.

Akroydon, Halifax, November 4, 1874.

DR. NICOL'S FRIENDLY CRITICISM.

To the Editors.

Gentlemen,—Dr. Nicol's statement in your last that he has "long had a considerable admiration for [my] genius" is really so very kind that it almost seems ungrateful to suggest any improvement in the form of his expression. At the same time I must confess I should have preferred it had he appended to his complimentary affirmation some such explanatory phrase as the late Artemus Ward was in the habit of employing, to the effect that "this is a goak" or "these remarks is all sarcazzum."

In the matter of gratuitous labour I am not insensible to the claims which others have upon me, in which respect, I believe, I have the honour of differing from the vast majority of mankind. Indeed, if I may believe my friends—which, by the way, I seldom do—my weak point is that I give too much and sell too little.

Respecting the anagrammatical form of expression, Dr. Nicol certainly has the advantage of me if he can "easily manipulate" any combination of letters and figures into coherent and sensible expression to a given effect and on a given subject.—I am, yours, &c., D. Winstanley.

Blackpool, October 31, 1874.

EXCHANGE COLUMN.

Cassell's *Technical Educator*, complete, bound in half-calf, 4 vols. in 2, new, offered for lantern slides; *must be good*.—Address, W. L. Brearb, photographer, Sun-lane, Burnley-in-Wharfedale, *viâ* Leeds.

I wish to exchange a Solomon's magnesium enlarging apparatus—good as new —for a swing-back camera, suitable for a three-inch focus lens, a rolling-press, or scenic backgrounds.—Address, Artist, 33, Sidbury, Worcester.

I wish to exchange a Ross's No. 8 new symmetrical lens for pictures up to 10 × 12, scarcely used, with stops complete, for a group lens by Ross or Dallmeyer up to 10 × 8.—Address, with full particulars, G. Mansfield, jun., Naas, Ireland.

ANSWERS TO CORRESPONDENTS.

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

⁂ We are this week compelled to leave over reviews and other matters, which we hope to find room for next week.

W. Hanson.—Received.

A. Copsey.—Will be attended to.

A. Nelson.—See our next number.

W. L. Brearb—The number is out of print at present.

L. M.—Divide Beaufoy by three; the result is the answer required.

Clericus.—You will receive an answer in the course of another week.

Medicus.—We are unable to give you a reply at present; but we shall in our next be able to answer your inquiry.

Inquirer.—*Common* ink will not answer, a peculiarly-fine kind being required. Try Messrs. Hughes and Kimber.

J. E. Hamilton.—There is no book published more suitable for your numerous requirements than an early edition of Handwich's *Manual.*

Jas. B. Findlay.—To produce a picture of the church which will be five inches in size the focus of the lens must be twenty-four inches equivalent.

Geo. Hooper.—Thanks. We are quite of your opinion respecting the merits of the Java views by Mr. A. Woodbury. See our remarks in the present number.

A. and J. Dobie (Adelaide).—Dick's treatise on optical instruments will suit you. Messrs. Chambers also publish a work which is useful, although not perfect.

E. S.—1. You can purchase the double sulphate of irom and ammonia very cheaply; do not attempt to make it.—2. As one is to three.—3. This query will be answered in our next.

A. H. M.—Until the index is published we shall not be able to refer you to the page at which the description was given. In the meantime, you may try a solution of nitrate of ammonia.

D D. S.—A tube that is said to be "hermetically sealed" is one the mouth of which has been fused together by heat. The top of a thermometer tube affords an example of hermetical sealing.

Old Subscriber.—We have not seen any of the magic mirrors to which you refer, but shall look out for them. We may, after seeing them, probably be, able to give you "the reason why."

A Portrait Painter.—A correspondent who writes under this signature, but withholds his name as a guarantee of his good faith, writes concerning the sensitiveness of gelatino-pellicle.

Prepared Albumen.—No fewer than nine correspondents have written asking what Mr. Dunmore means by "prepared albumen." Probably Mr. Dunmore will kindly answer these querists.

W. L. (New South Wales).—The lens appears to be a very good one, and none of the shortcomings of the photograph are to be attributed to it. The real fault must be sought for in bad lighting, under-exposure, over-intensifying, &c.

P. C. F.—We are most familiar with B, but there is no difference between the two in respect of quality. If you enclose a catalogue, together with an addressed wrapper, we shall place a mark against those articles most likely to be of use to you.

Gonios.—Chloride of calcium may be prepared by adding chalk or whiting to hydrochloric acid until all effervescence ceases. The solution should be filtered through cotton cloth and evaporated over a very slow fire to the consistence of syrup. Allow it to cool, and large crystals of chloride of calcium will be formed.

Philo.—This correspondent sends five queries on a post card, not one of which has any connection with photography. We are not special sticklers for the strict etiquette which should prevail between correspondents and journalists, but a line must be drawn somewhere; hence we cannot devote space to answering "Philo."

Robert Bridgart.—1. A suitable degree of strength for a solution of bichloride of platinum for toning transparencies is that which will penetrate through and stain the deposit forming the picture in about a minute.—2. We do not think any duty will have to be paid, but we are not quite sure on this point. If you make application to the office of Inland Revenue you will probably receive the information required.

Joseph Bowman (Preston).—This correspondent, after having "taken a rise" out of Mr. Winstanley's "anagrammatical" formula, and speculating as to its nature, says, *apropos* of coloured glass—"The best application of stained glass is to take positives upon them. The ruby and the amber give splendid portraits, exquisitely soft and beautiful, and I doubt not but other colours will answer equally well. They need no black varnish to the backs. In my opinion they rival the best ferrotypes."——We may here observe that if by using coloured glass plates ferrotypes can only be "rivalled," there is decidedly no advantage in their use.

Fuming Paper.—Since the letter of Mr. T. P. Smith concerning the fuming of paper was put in type we have received another from that gentleman, in which, referring to Mr. Warner's article in our issue of the 30th ult., he says:—"I think there must be an error somewhere—either in Mr. Warner's communication to you or a typographical one on your part. The fuming of paper for *five seconds* is simply no fuming at all and complete nonsense, and anyone may certainly have no fear of injuring their negatives thereby. Another remark I would make. As paper should be fumed from *fifteen to twenty minutes* in a tight box over a saucer of strong ammonia, after the paper has been thoroughly dried, there is, then, no right or wrong way about it; and however yellow the paper may get by fuming the whites will be perfect when fixed."

Daring Robbery.—On Sunday night last the police discovered that the premises of Messrs. Murray and Heath, opticians and philosophical instrument makers, Jermyn-street, St. James's, had been broken into, and a large quantity of valuable goods abstracted. From the clever manner in which the entrance was effected, and the discrimination as well as singular skill displayed in the selection of the various parts of the stock laid under contribution, the hypothesis is that the robbery was effected by some one possessing an intimate knowledge of the premises. The description of goods stolen consist mainly of field and opera glasses, telescopes, and gold and other eye-glasses of every description.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 758. Vol. XXI.—NOVEMBER 13, 1874.

BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

It is not unfair to assume that a book must be highly popular which year after year augments in bulk, and of which the number printed of each successive edition has to be greatly multiplied in order to satisfy the increased demand. Such a book is the once small but now plethoric Almanac issued in connection with this Journal. In every studio in this country, as well as in the remotest districts of India, Australia, America, and, indeed, wherever photographic enterprise exists and the English language is spoken, will be found this now well-known and much-appreciated Handbook of Photography, aiding thousands of readers by its practical instructions and thoughtful and diversified articles.

As regards the richness and variety of its contents the volume for 1875 will certainly not be inferior to any of its predecessors. It will contain records of the matured experience of our foremost experimentalists and workers, tables for guidance in everyday practice, formulæ for ready reference in the studio, and such a variety of original articles in connection with the several departments of our art-science as cannot fail to provoke responsive thought, and add to the scientific knowledge and artistic and manipulative skill of all classes of its readers.

A work of this nature is essentially one possessing the utmost value for advertisers, making known, far and wide, their specialities; hence those desirous of availing themselves of its permanent character, and of the extended publicity its advertising pages afford, are respectfully requested to communicate without delay with the Publisher, who is now registering orders for advertisements for this popular serial, priority of position being determined according to the order in which applications for space are received. In order to secure precedence in position, in cases where the advertisement has not yet been prepared, it is only requisite to forward, in course of post, to the Publisher an order to retain the necessary space desired, stating whether whole, half, or quarter page.

Terms and other information may be seen on reference to our advertising columns, or on application, by letter or otherwise, at the Publishing Office, 2, York-street, Covent Garden, W.C.

ON PRINTING GLASS TRANSPARENCIES BY APPROXIMATE CONTACT WITH THE NEGATIVE.

Great practical interest must always attach to any really good method of printing transparent positives upon glass from glass negatives. It is generally admitted by photographers that there is nothing more beautiful in their art than a fine transparent positive upon glass, rich and vigorous in colour, full of beautiful gradations and elaborate detail, and of faultless definition, viewed, not by reflected light, but by light which has been directly transmitted through the proof. The public have also endorsed this opinion, and most of us can remember the time when, whilst the finest stereoscopic prints upon paper were selling at a shilling each, those upon glass, by Ferrier and others, were fetching at least five times that amount. The coarseness of surface of a paper print cannot be entirely concealed by any process of albumenising, rolling, or hot pressing, whilst the surface of glass, for the purpose of the photographic printer, is nothing short of perfection itself. It is true that wonders may be effected in the way of enamelling paper prints by the modern methods, and that treated in this way they are often extremely beautiful; but, after all, when all has been done for paper to render it, if possible, equal to glass, still the paper print must be looked *at*, and not *through*, and that wonderful charm of a transparency which consists in its being viewed by *transmitted* light, by which the effect of real daylight is produced, is absent in the paper print. Besides which, photographs upon paper enter into more direct rivalry than those upon glass with works of art proper, such as engravings; and the spectator, however charmed he may be with the minuteness and truthfulness of detail of a photograph, misses, in general, all that pretty play of light and shade, as well as the animation, which a clever artist with his pencil knows so well how to introduce into his works. It is this demand for artistic prettiness in a paper photograph, which it is so extremely difficult to satisfy by chemical and optical means only, that has caused to be introduced into the photography of the present day so much retouching and sophistication of negatives; but this remark is not true to the same extent of photographic transparencies upon glass. There is little or nothing in ordinary works of art to enter into direct rivalry and comparison with photographs of this class. The photographic transparency upon glass is a thing *sui generis*—a speciality which one does not criticise from the same standpoint as a paper print, and its shortcomings, from a purely artistic point of view, are overlooked for the sake of its special merits. Why then, one is inclined to ask, has it happened that up to the present time so little has been done by amateurs in this style of printing in comparison with that upon albumenised paper? The question is an important one; for, if it can be shown that most amateurs have many negatives in their possession which when printed honestly upon paper yield results of but little interest in an artistic sense, but which if printed upon glass as transparencies would please every beholder, for reasons irrespective of art and art criticism, the value of a good and simple method of printing transparencies from such negatives will become very great.

The processes in common use for printing glass transparencies are three in number. First, there is wet collodion, with a copying camera; second, dry collodion plates, by actual contact; third, wet collodion plates, by approximate contact—that is to say, with strips of cardboard interposed between the positive and the negative.

The second method involves the risks of cracking and scratching the negative; but as printing by contact has the advantage of simplicity, as well as the certainty of freedom from distortion in the print, we have made an apparatus for printing upon a wet collodion plate when that and the negative are separated by thin strips of cardboard round their edges, and when the negative is at least six and three-quarters inches square; for it is evident that what may be true of a negative of the quarter-plate or *carte-de-visite* size may not be equally true of negatives of larger size when common glass is used instead of plate glass in the operation.

For some remarks on the sharpness that may be obtained when even the negative and the sensitive surface are so far apart as the thickness of a plate of glass, we refer the reader to a former volume—that for 1870—where, at page 456, in the course of an article on printing opalotypes without contact, we described how Mr. Fox Talbot had obtained some very sharp photoglyphic engravings from transparencies, printing them through the glass. The method now to be described in connection with the printing of transparencies for the lantern differs in its details from that we previously published, the principle being, however, the same in both, viz., the avoiding of parallax.

The apparatus consists of a box similar to that we have before described as being used in the production of reliefs in the Woodburytype process, being forty inches long and seven inches square inside, with both ends open, but capable of being closed by lids. At one end of this box are placed the negative and the wet collodion plate, separated by strips of cardboard round their edges; and at the other end is placed one of a set of diaphragms, four in number, having circular apertures of three inches, two inches, one inch, and half-an-inch diameter respectively. The lids are then closed and the apparatus is carried out into the light and placed with the end in which is the diaphragm pointed towards the sky, the other end resting upon a chair or upon a plank laid upon the ground. The upper lid is then opened and the exposure given, the time depending upon the size of the diaphragm. And here we may observe that the object of these diaphragms at the open end of the box was to see whether they had any good effect in sharpening the definition in cases where it was faulty when the box was used without any diaphragm at all.

After making numerous experiments with different negatives and prepared plates, all being upon the common glass used in photography—such as flatted crown, &c., obtained from the best makers—the results showed that sufficient sharpness was rarely obtainable, and that the size of the diaphragm had little or no good effect in improving the faulty definition. On the other hand, we invariably found that, when both the negative and the prepared plate were upon *plate* glass, excellent definition was obtained, even without any diaphragm at all. We observed, moreover, that in all these experiments it was important not to introduce any pressure upon the *centre* of the plate, for that invariably produced absolute contact in that part, the result being that the negative was wetted by the wet film of the other plate, and the print itself spoilt by a peculiar kind of marking where contact had taken place.

We have also tried exposing the pair of plate glasses without any apparatus, but merely laid one against the other, with strips of cardboard between them, upon a board, and held together by the fingers and thumbs, the exposure being made at a distance of a couple of yards from an ordinary window. The result was a perfectly-sharp print.

The practical conclusion to be drawn from these experiments is that, if a photographer wish to print glass tranparencies upon wet collodion plates by approximate contact with negatives of about the half-plate size or larger, he should certainly work upon plate glass or upon a really good substitute for plate, and not trust to any other kind of glass, however suitable that may be for his ordinary work.

Another conclusion at which we have arrived is that the long box we have described as a means of sharpening the definition and cutting off very oblique rays of light is by no means necessary for this style of printing.

It will be understood, of course, that our remarks respecting the use of plate glass for both negative and print only apply to cases where the negative is of the half-plate size and upwards. For *small* negatives—say three inches square or four inches diagonal—it is quite possible that good flatted crown may be found to answer the purpose. This remark is important, because in some of the processes of enlargement now in use a positive glass transparency is printed by contact, or approximate contact, with a negative of the *carte* size.

PRINT BURNISHING.

Since we last addressed our readers on the subject of burnishing prints burnishers for this purpose have been introduced into this country, and are now recognised articles of commerce.

Like some other mechanical appliances, the value of which we have not been slow to recognise, the photograph burnisher is an American invention. Many changes will doubtless be, and some, indeed, have already been, rung upon the primary idea of Mr. Weston, which latter is that the albumenised print shall be dragged over a polished bar of hard metal, the metal having been previously heated to a somewhat high temperature. This action constitutes burnishing, in contradistinction to rolling or pressing, in which process the portion of the polished plate in contact with the picture does not alter its place relatively to the surface of the print, the smoothness being imparted in this case by powerful pressure against the polished plate.

Having seen some fine specimens of surface-finishing which were indebted for their brilliant surface to the burnisher, we imagined that the introduction of an instrument capable of effecting such a marked improvement would have been hailed as an important acquisition to the appliances of the professional photographer. We have since witnessed the burnisher in operation and observed the facility and certainty with which a surface possessing a high degree of finish was given; we were, therefore, not a little surprised at the expressions of unfavourable opinion with respect to such facility which appeared in the transactions of one of our northern societies, because to us it seemed that nothing could well be simpler than the manipulations involved. It since appears, however, that the objectors recorded their dissatisfaction after an imperfect trial, and that their original expressions of disapproval have since been retracted. This is as it should be; but it points a moral as to the propriety of not pronouncing judgment upon any matter whatever until after a thorough trial. Experience to a certain degree is quite as necessary in using a new tool with any amount of freedom and success as in practising the collodion process, which, notwithstanding the fact of many having failed with it, we all recognise as one of the most stable and, on the whole, one of the easiest of photographic processes.

With the view of ascertaining experimentally the real difficulties attendant upon the use, and also of determining the value, of the hot burnisher we have made a systematic course of trials with one kindly placed at our disposal for the purpose by Mr. John J. Atkinson, of Liverpool, the wholesale agent in this country for the Weston burnisher. We may premise that the instrument referred to was one casually taken out of Mr. Atkinson's stock, and not in any sense a special sample. Previous to commencing operations we read carefully the very few instructions which accompanied the instrument, amounting, in effect, simply to the following:—The burnisher to be warmed before being used, and the face of each print to be slightly lubricated with alcohol containing a solution of Castile soap in the proportion of about a grain to the ounce.

Having screwed the burnisher firmly down to a table, and allowed the spirit lamp to act for a sufficient time to warm the burnisher, we passed through the machine fifty prints previously selected as being of little value; for, in deference to the adverse report from the north, we did not choose to subject valuable pictures to the operations of an instrument that might not eventually prove successful with more than one-half the pictures on which the trial was being made. To what cause the result secured is to be attributed we shall not pause to inquire, but merely state that of the fifty prints upon which we made our first trial *not one was damaged;* all were burnished so successfully as to prove highly satisfactory. As a standard up to which to work we had lying before us two charming pictures received from America, and which had been burnished to an exquisite surface. After due comparison it was found that the results of our first attempts with the burnisher were, at least, not inferior to the American works alluded to, and which had been finished by workmen of the greatest experience.

The conclusion at which we have arrived is this—that, if a very small degree of care be taken to carry out the instructions issued by the patentee or agent for the Weston burnisher, it is next to impossible to fail in getting a high degree of polish on the surface of any albumenised print; and, in these times of keen competition, any legitimate mode of realising two or three shillings additional in each dozen pictures should commend itself to the photographer. There can be no question as to the superior appearance possessed by a well-burnished photograph compared with a picture not so treated; and, further, there can be no doubt the public will very willingly pay a higher price for photographs thus finished than for plain rolled prints.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

[Concluding Notice.]

The most noticeable feature in the Exhibition was the collection of enlargements by Messrs. Spencer, Sawyer, Bird and Co., which were not more attractive from their great dimensions than from their admirable quality. To these we have already alluded.

The large direct heads by Messrs. Chaffin and Son, which secured the first Crawshay prize, were undoubtedly most excellent. Mr. Crawshay himself was very justly awarded the second prize. Mr. Slingsby's large portraits were also very fine, and were universally acknowledged to be the best in the second series. With a little longer exposure the portraits by Messrs. Robinson and Cherrill would have been better and more harmonious. Mr. Neilson made the mistake of sending in large portraits quite untouched, doubtless thinking that, in what professed to be an exhibition of photographs, more interest would have been taken in unsophisticated works of this kind than in those which owed a considerable portion of their merit to skilled artistic labour.

The very charming cloud studies by Mr. Stoddart formed an attractive feature in the Exhibition.

An extensive collection of views in London, by Mr. F. York, of rare excellence are deserving of a much longer notice than it is in our power to give them at present. They were faultless.

There were some very magnificent landscapes exhibited in competition for the Crawshay awards in that department. Mr. Crawshay's own works in this direction may be mentioned with much commendation. The name of Mr. Hudson, of Ventnor, is a sufficient guarantee for the quality of his work, which was uniformly excellent. Another Ventnor exhibitor, Mr. W. Nicholson, also took a good position. When examining the Welsh scenery so well depicted by Mr. Gulliver one instinctively envied a man who, from his local position, has easy access to scenes so attractive as those which afforded "food" for his camera. In the various exhibits of Mr. Vaughan considerable fertility of artistic resource was displayed.

It is worthy of notice, as a matter of process, that Mr. Sanderson, of Manchester, who most worthily obtained two prizes in the landscape department, almost invariably confines himself to a dry process—the collodio-albumen.

Like Mr. Sanderson, Messrs. Robinson and Cherrill were the fortunate recipients of two prizes for the three landscapes exhibited by them. Three views in France, by Mr. Sydney Smyth, were worthy of notice from the effective treatment of the skies, as well as for other reasons.

Who would not envy Mr. J. Brier such subjects as those to which his camera was directed? As an interesting topic the view of the famous Newhall telescope, by Mr. H. Piper, received much notice from scientific visitors. Mr. Reuben Mitchell exhibited some good work.

Antipodean photography was well represented by Mr. Mundy, whose album, well stored with choice New Zealand subjects, was much sought after by the visitors.

We frequently hear about the boasted superiority of our continental brethren in respect of portraiture. Those who examined the collection of enlargements exhibited by Signor Ponti, of Venice, would conclude that, after all, we had not much to fear from Italian rivalry.

We now take leave of the Exhibition of 1874, regretting that we have overlooked the claims of many who, by the numerous and excellent works of genuine art exhibited by them, may justly consider themselves entitled to special notice. We crave their pardon.

ON THE REPRODUCTION OF NEGATIVES BY THE "DUSTING-ON" PROCESS.

Photographers have long stood in need of a reliable method by which negatives might be reproduced or multiplied when required, the various plans hitherto employed having been all more or less defective; indeed, it had come to be considered impossible to produce a duplicate at all approaching the original in its printing qualities.

To Herr Obernetter, however, belongs the credit of having popularised a method, now known as the "dusting-on" process, by means of which copies of negatives may be made not only equal in every respect to the originals, but defective ones may be modified to such an extent as to give results far surpassing the originals. This process, like many others, has been before the public, in principle, for many years, but it is only recently that it has been applied to the special purpose now mentioned. Its chief use has hitherto been in connection with photo-enamelling, in which branch of photography it affords special facilities for the production of pictures in vitrifiable materials. Mr. M. Carey Lea, who has recently put in a claim to originality in the matter, recommended a similar mode of procedure, some years ago, for the production, if my recollection serve me rightly, of paper pictures; but on this point I only speak from memory.

Since the first notice of Herr Obernetter's application of the principle appeared in these columns it has been treated in detail by that gentleman himself, as well as by Mr. W. B. Woodbury and the Editors; and I now propose in the following observations to give my experience in working a process which, unlike many, appears to justify the very high encomiums passed upon it when first given to the public.

The formula I have chosen is that given by Herr Obernetter in these pages a few months ago, which, substituting English for the French weights employed by him, stands thus:—

Dextrine	1 ounce,
White sugar	1½ „
Bichromate	½ „
Water	25 ounces,
Glycerine (at this time of year)	15 drops,

very carefully filtered.

The plate, having been thoroughly cleaned and dusted, is slightly warmed, and the solution, also warm, is poured on in the same manner as collodion. Here the first difficulty, as mentioned by Mr. Woodbury and the Editors, is encountered—the liquid probably refusing to cover the plate evenly. Dipping the glass in hot water for a few moments, previous to coating, mitigates the evil to some extent, but even that is not always successful. The best plan I have found is to pour a little of the dextrine solution on to the plate, leading it over the surface with the finger where it refuses to flow. If it exhibit a tendency to leave any portion of the plate, as if from greasiness, a slight "rubbing in" with the finger will cause it to "take the surface." Return the first quantity of solution to a *separate* bottle and coat again with fresh; pour off, not too closely, and dry by heat, preferably in a horizontal position, though I find it most convenient to drain and dry in front of a clear fire. The only objection to the latter plan is that if a collodion substratum be used, as recommended in an editorial article a week or two since, the layer of gum is too thin to protect it, and upon applying the transfer collodion the substance is partially dissolved and the image destroyed. The plate must be heated until the surface is hard and quite free from "tackiness," and while still warm must be placed in the printing-frame. At this stage it should have a bright, glossy surface, transparent, and entirely free from specks or spots. After exposure the image should be faintly visible of a darker colour, its strength depending a good deal on the *quality* of the light, sunshine producing a more vigorous visible impression than diffused light, though the developable image may in each case be similar.

As regards exposure, it is difficult to give any standard by which to measure; but in this respect, fortunately, there is considerable latitude. The character of the original and the class of negative it is required to produce also cause considerable variation in the exposure. As a general rule a hard negative will require a comparatively shorter exposure than a soft or flat one, and *vice versâ*, though even then, perhaps, more may be done in the development than by difference in exposure. My own impression is that a maximum exposure is the best, as the development is then more under control; and, though that operation may occupy a considerably longer time, the image produced is much finer, just as a pyro.-developed image is composed of finer particles of silver than is an iron-developed one. With a minimum exposure, on the contrary, the development is rapid, and unless very great care be taken the image is apt to be granular. The surface is also so extremely hygroscopic that it is impossible to resort to the expedients of blowing or breathing on the plate to bring up sluggish details; and it is dangerous even to stop the development for very long, so rapidly does the dextrine compound absorb moisture from the atmosphere. To show the extent of latitude permissible in the matter of exposure I have exposed the same negative (a rather thin one, with transparent shadows) for twenty minutes in a rather dull light, and again for half-an-hour in November sunshine, the only difference in the results being that, of the two, the latter possessed the greater contrast.

Upon taking the plate from the printing-frame the surface will, in all probability, be found slightly "tacky," especially at the edges. If it be developed while in this state the first touch of the brush will produce a shapeless smudge, all further treatment only serving to make it denser. To obviate this the plate must be again warmed until its edge retains no impression when touched with the finger, and before it has time to cool the "dusting-on" should be commenced. The first few strokes of the brush will render the image visible by reflected, though scarcely by transmitted, light, and as the plate cools it will gradually become more dense. The operation requires the greatest care and patience; for if it be hurried by breathing or blowing on the surface of the plate the result is almost certain to be unsatisfactory. If, after brushing for some time, the effect should appear to come to a stand-still, lay the plate aside for a few minutes in a slightly damp atmosphere and then resume the brush, first, however, trying the edge with the finger, to see that it is not too damp. Should the picture contain masses of heavy shadows which refuse to show any detail, these portions may be worked upon alone, but only in the most desperate cases should breathing on the plate be resorted to.

When finished the surface has a semi-matt appearance, except in the very deepest shadows, which should retain their original gloss, and the picture, when viewed at an oblique angle, has something the appearance of a dull daguerreotype.

The next proceeding is to brush off all superfluous plumbago with a clean brush kept for that purpose, and then to coat with collodion. This collodion should contain about nine grains of pyroxyline to the ounce, and just sufficient castor oil to render it non-contractile. A single drop of glycerine to each ounce is also an advantage. If too much castor oil be added the collodion does not adhere sufficiently to the plumbago, but leaves part of it on the glass when transferred.

Having poured on the transfer collodion let it set thoroughly, and then cut round the edges of the plate so as to free the film, and place it carefully in a dish of water. In a few minutes the collodion film will float off, carrying with it the plumbago image. This tissue is quite strong enough to bear handling, and may be removed to a dish of clean water to wash out the last traces of bichromate, which accomplished it may be floated on to a clean glass plate in the usual manner.

If a non-reversed negative be required it will be necessary to turn the film over on its final support—that is to say, to float it on to the plate with the collodion to the glass. It may then be drained, dried, and varnished in the ordinary way.

A few words on the subject of plumbago may be of use to those who, like myself, experience any difficulty in procuring the article. I was much astonished to find that the coarse "powdered blacklead" of the oilman was the only thing I could obtain, so I set myself to work to powder it myself. My advice to others is—"Don't try it, for you won't succeed." Eventually I rigged up a little contrivance, after the style of the drum-sieve of the druggist, and commenced work upon the despised article supplied for polishing and lubricating purposes. My sieve was simply a tin canister with a deep lid; the bottom part contained the coarse plumbago, and over it was tied a piece of fine cambric, and the lid put on. By dint of half-an-hour's vigorous shaking, lid downwards of course, I produced sufficient "developing powder" to last me for some time. I generally use a flat camel's-hair brush, about an inch and a-quarter wide, and a smaller round sable for special purposes.

In conclusion: I can only recommend amateurs to try this process during the "off" season. Improving their old negatives at a time when they are, perhaps, unable to take new ones, will furnish profitable employment. W. B. Bolton.

PRE-LIGHTING THE PLATE.

As this subject is now attracting attention a record of some experiments I made may not be out of place.

After making a number of trials with every sort of light for supplementary exposures, I was unable to obtain a result really satisfactory to myself. I tried opal and ground glass—green, blue, and other colours—but in no case with success. Then a suggestion was made (I believe in your columns) to use a gas flame, to which the plate should be exposed, and on trying that I at once found an advantage accruing from its use. A few exposures to it soon showed how much time should be given to a plate, and I used it occasionally with certain subjects successfully. But I never exposed the whole of the plate to the gas. I cut a rough mask, and, having put the plate in the slide, laid the mask on the back of the plate and exposed to the gas any part I desired.

Thus a black velvet dress or cap, or portions of the background or black hair, could be exposed without in any way affecting the delicacy af the shadows in the face or other parts of the subject. The face and hands rarely require it, but it is occasionally of use to the furrowed eyes. It *does* induce fog, but detail comes with it; and the great advantage of using gas is that you regulate so exactly the amount of exposure and stop short of too much fog. You can minimise the fog by having a suitable developer, and yet gain additional detail. H. Stuart Wortley.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

I learn from rumour, with much gratification, that the exhibition of the Photographic Society has proved financially successful. From the fact of the exhibition having to be held a month earlier than usual, when so many patrons of art are "out of town," I was afraid the expenditure would have been considerably in excess of the receipts; but this, I am glad to learn, is not the case. I here inquire if it be greatly to the credit of the photographic societies of the metropolis that they are bandied about from "pillar to post" with respect to a place in which they can meet with a certain amount of proprietary freedom? Numerous other scientific bodies have their own places of meeting, regarding which their members may say or sing "be it never so humble, there's no place like home." As for a home in that sense, however, non-incorporated London photographers have none; hence the necessity arises for the London Photographic Society holding its exhibition at a time when the halls are unoccupied by their usual picture-exhibiting occupants; and hence also the reason why the South London Photographic Society had been apparently nonplussed as regards a place in which to hold their one night's technical exhibition, as well as a place for their ordinary monthly meetings. Property in London is expensive, as everybody knows; but it is not so expensive as to prevent a large and influential Society like the representative body of London photographers purchasing or leasing a site and building a hall, or, perchance, purchasing a hall ready built. A good hall is usually found to be valuable property, hence it is not too much to assume that if the London Photographic Society had such a hall they might not only sit rent free, but pocket a nice little annual income, which they might give away—not in prizes for pictures, of which there has been too much of late, but—in prizes for inventions, discoveries, and improvements in connection with photography, as well as for original investigations and papers. *Then* would the London Photographic Society indeed render itself useful to the world.

During the past month or two the subject of preliminary or auxiliary exposures appears to have undergone a kind of resuscitation, if we may judge by the fact of its being a good deal talked about among photographers. If it be of any use at all the dull weather of November, with its proverbial fogs and murky brown skies, certainly affords the fitting conditions for ascertaining the value of whatever will tend to shorten exposure in the camera. One dull afternoon, last week, it was of some importance that a negative should be taken of a lady who was leaving for India early the following morning. I gave a very long exposure with a doubly-rapid baby lens, but could only succeed in obtaining a thin, flat, feeble, miserably-underdone picture. But I had another plate prepared, and, having apprised the fair sitter of my intentions, I exposed again just as before, but with this rather important difference—that when the sitting, which was of the same duration as previously, had been nearly finished, I ignited a taper composed of three strands of magnesium ribbon, and directed its light upon the sitter, using a large sheet of white cardboard for reflecting and diffusing the intense magnesium flame, which I moved slightly during the time it was burning, occupying only a few seconds. The negative which resulted from this treatment was so excellent that I enclose herewith a print from it to lay upon the "editorial table," in order that it may be shown to any of your photographic visitors who may be interested in this way, not merely of shortening exposures, but of taking a picture at all under such adverse conditions as those mentioned. I challenge comparison with any negative taken under the most favourable circumstances.

A RAPID DRY-PLATE PROCESS.

[A communication to the Photographic Section of the American Institute.]

Before reading the paper that I have prepared I will state preliminarily that I have found it a very common thing among photo-

* Concluded from page 534.

graphers that when they get a new formula they do not follow it exactly. It is strange, but nevertheless true, that, with very few exceptions, I have never known a photographer to work a published formula as it was given. They all have an idea that this or that little thing is of no consequence, or they know that it will not work so well, and so they put in something else and get it all mixed up, and then they say that the formula itself is all nonsense and will not work. I have many times given formulæ for dry plates to parties that were working dry plates and wanted to try the formulæ, but they always substituted something else when they came to try them. I hope no one will condemn the formulæ that I now give unless they follow them exactly as I give them.

At a previous meeting I alluded to the fact that a collodion containing a chloride was better adapted for making *dry plates* than ordinary bromo-iodised collodion, especially if alkaline development were to be used.

In continuing my experiments in that direction I found that plates prepared with a collodion containing a chloride were peculiar, inasmuch as a plain pyrogallic acid solution would develope a picture with about the same exposure as a wet plate. The image was always very *thin* and *delicate*, but full of detail and readily responded to the action of acid pyro. and silver, so that no great difficulty was experienced in obtaining negatives of sufficient density. I found, however, that a slight trace of alkali, with a trace also of bromide of potassium, facilitated the development. It brought up a much stronger negative at first, and much less labour was required to obtain the proper density.

I had, at the same time, compounded a new preservative, the result of experiments carried on simultaneously, and which has much to do with the extreme sensitiveness of the plates. I therefore propose to give in detail the whole process, with the formulæ for the collodion, also, which I have found to be the best.

First, the collodion formula. I use—

Alcohol and ether	Equal parts.
Bromide of cadmium	1¼ grain to the ounce.
Chloride of calcium	1 „ „
Iodide of cadmium...............	4½ grains „

Dissolve the salts in the alcohol in the order given; when dissolved add the cotton. A short-fibre cotton should be procured, if possible; five grains to the ounce will ordinarily be found to answer. If the cotton be perfectly free from acid, collodion so prepared will keep for a year or two without any change for the worse. Before using it should be rendered an orange colour with a scale of iodine. I have made beautiful negatives with it when only a few hours old.

I would state here that I have compounded a collodion for outdoor wet plates with the same salts in different proportions, using half-a-grain of the bromide, the same quantity of chloride, and five and a-half grains of iodide, which I designate my "No. 2."

The mixing of the No. 1 and No. 2 in equal quantities forms what I call my "No. 3."

In my experiments with some forty different salted collodions I do not hesitate to say that these are decidedly the most sensitive. I am sustained in my conclusions by some of our most experienced photographers, both in and outdoor workers. The No. 2 is, however, preferred for outdoor work to No. 1 or No. 3, unless the picture to be taken is mostly in shadow, when Nos. 1 or 3 would be more suitable.

In making dry plates a bath should be used which gives good, brilliant negatives when wet. The plates should remain in the bath about five minutes; when taken out they should be plunged into an upright bath of distilled water. If they are laid in a horizontal dish the iodide of silver formed by the small portion of the negative bath adhering to the surface of the plate coming in contact with the water will precipitate on to the surface of the collodion film, and result in producing innumerable pinholes when the plate is developed.

There cannot be too much stress laid upon the importance of using *pure water* for the first washings. This has been reiterated by every successful dry-plate worker who has written on the subject; and yet I frequently find photographers expressing disgust at the result of their efforts with dry plates, when failure has been due entirely to a disregard of this important injunction. When reliable distilled water cannot be procured water obtained by melting ice will answer. Besides the upright bath I use two horizontal dishes of distilled water. By so doing I keep four plates in the work and finish one every five minutes, or the time it takes a plate in the negative bath, thereby losing no time. A plate is taken from the negative bath and placed in the upright water bath; another plate is flowed with collodion and placed in the negative bath. The plate in the upright water bath is then removed to one of the horizontal dishes. This is continued until both horizontal dishes contain plates, when there will be four plates in course of preparation.

I then take the first plate from the last horizontal dish and give it a slight washing under the tap. I then place it in a dish containing a four-grain solution of chloride of ammonium, where it remains while I remove a plate from the negative bath and coat another.

The plate is then taken from the salt solution, washed under the tap, and placed in a dish containing the preservative, where it is allowed to remain one or two minutes; the time is not material. It is then taken out, the back wiped with a sponge, and set up to dry.

I have found that the drying is much facilitated by wiping the back. I have observed that the collodion side of a negative never dries while the back is wet. This fact could be used to great advantage by those requiring long exposures with wet plates. By placing a wet piece of blotting-paper over the back of the sensitised plate, the drying of the collodion plate could be prevented for a long time. It is important that the drying of the plates should not be retarded, and the sooner the drying is effected under ordinary circumstances the better.

The solution of chloride of ammonium can be used several times.

My preservative solution is made as follows:—

Water	10 ounces.
Tannin	50 grains.
Laudanum	1 drachm.

The addition of laudanum to the tannin solution produces a precipitate of the gum in the tannin. I thought, at first, it was the opium contained in the laudanum; I found it, however, wholly insoluble in alcohol. I therefore concluded it came from the tannin solution.

This precipitation should be filtered out, and then 150 grains of pulverised gum arabic added. If the gum be added before the laudanum there will no precipitate be formed, and the resulting compound will not answer the same purpose.

After the solution has been again filtered it is ready for use. I have made good negatives with plates prepared by the foregoing process in from five to ten seconds' exposure, which was quite as quick as a wet-plate negative could be made under the same conditions.

To develope I use two wide-mouthed vials holding about two ounces each. Into one I put one drop of a solution of aqua ammonia, half water, and one drop of a ten-grain solution of bromide of potassium. Into the other about three-quarters of an ounce of a three-grain solution of pyrogallic acid.

I first wash the plate thoroughly and flow over it the plain pyro. solution several times, then pour it into the bottle containing the ammonia and bromide of potassium, and then flow again over the plate. The image comes up instantly full of detail, if the exposure have been rightly timed. When this development has proceeded far enough it is washed off, and the plate flowed with a weak solution of citric or acetic acid to neutralise the ammonia.

The image can then be brought to the proper strength either by the ordinary acid pyro. solution or with pyrogallic acid and tannin. I use the latter, as it is the most convenient; it keeps for a long time, and is the most energetic. I mix it six grains to the ounce of pyro. and tannin, generally using half that strength. It is, however, very convenient to have it the full strength, as it is a powerful developer, and gives fine negatives with these plates without the alkali, giving about twice the exposure. I fix the negative in a strong hypo. solution made a little acid with acetic acid. The addition of a small quantity of gold and silver to the hypo. will prevent the reduction of the negative in fixing.

There has been some objection to gum arabic in the preservative, on account of the tendency which the negatives have to blister when being developed, if it be used. I have experienced, however, no trouble of this kind, which may be due to the exceeding small quantity of alkali employed. If, however, any should object to using the gum, they will find an excellent substitute in sugar of milk, ten grains, and grape sugar, five grains to the ounce of preservative.

I always use albumen, sixteen ounces of water to the albumen of one egg, for a substratum for my plates, and have experienced no trouble from blisters with either the gum or sugar of milk. I have brought several negatives with me, so that you can judge for yourselves of the capability of the process I have been describing.

You will observe that I use an 8 × 10 plate, on which I can make two 5 × 8 stereoscopic negatives, or one stereoscopic and one 5 × 8, or two 5 × 8, or one 8 × 10. My box is also equally well adapted to indoor work, and is arranged for making negatives of all sizes, from 8 × 10 to half of a 4-4. It was manufactured expressly for me by the American Optical Company, and is the most convenient as well as the most perfectly arranged box with which I have ever worked.

Since writing the above I have continued my experiments, and have some modifications to suggest.

The No. 1 collodion should have one and a-half grain of chloride of calcium instead of one grain.

The developer I now compound as follows:—

Water	3-4 ounce.
Ammonia	1-4 „
Bromide ammonium	10 grains.

To develope an 8 × 10 plate, put three drops of the above into a wide-mouthed vial. After washing the plate thoroughly flow over it three quarters of an ounce of a three-grain pyrogallic acid solution. If the exposure have been right the image will appear immediately.

After the detail is well out pour the pyro. solution into the vial containing the alkaline compound, and again flow over the plate. The image will instantly assume strength and brilliancy.

It should be finished with acid pyro., or tannin and pyro. in equal parts. The quantity of the alkaline solution to be used will depend upon the exposure.

One drop will be sufficient if the exposure have been one minute with a quarter-inch opening in an eight-inch lens. H. J. Newton.

FOREIGN NOTES AND NEWS.

Photography in Natural Colours.—Marbled Stains on Negatives. — The Taupenôt Process. — Monument to Frederic Sauvage.—Photographic Society of Berlin.

A most extraordinary piece of news has just reached us from Paris, which we give on the authority of those whose names are associated with the experiments described, viz., MM. Ducos du Hauron, Geymet, and Lacan. It appears that the first-named of these gentlemen placed in the hands of the second three negatives which he had taken of a coloured object—one with a green glass before the lens, another with an orange-yellow glass, and the third with a violet glass. M. Geymet, instead of printing from these negatives three proofs upon coloured pigmented papers, in the manner described in our *Foreign Notes and News* at page 519, printed a proof from each negative upon a separate dry plate by contact, the plate having been prepared by the bromised collodion process. Imagine his surprise on finding that the negative taken with the green glass before the lens gave a print of a red colour, that taken with the orange-yellow glass a print of a blue colour, and that with the violet glass a print of a yellow colour. On repeating the experiments the same results were invariably obtained. It then only remained to place the three coloured prints in contact, and look through them as a combined transparency, to perceive the true effect of a heliochrome. M. Lacan states that he has been shown the above results by M. Geymet, and that the matter is to form the subject of a communication at the next meeting of the Photographic Society of France.

It is expressly stated that the negatives were taken by the usual process in monochrome, and we conclude that in colour they were undistinguishable from each other. Is it not extraordinary, therefore, that negatives merely differing in intensity and in their details should give prints of such different colours when printed by contact with dry bromised-collodion plates? The faith of some of our readers in this marvellous result will probably be strained to the utmost, and we shall all await with curiosity the further development of a process which, if not altogether a delusion, seems to contain the germ of photography in natural colours.

M. le Comte Ludovico de Courten, an Italian gentleman who is now working at photolithography in Florence, has given the following mode of getting rid of the marbled stains which sometimes occur in iron-developed wet collodion negatives when the nitrate bath is old and overcharged with foreign matter. Before developing the negative he places it, film outwards, resting against a wall, with its lower edge upon a piece of blotting-paper in order to absorb the free nitrate solution as it gravitates downwards. He also applies a narrow band of blotting-paper to the surface of the film itself at the bottom. When the surplus moisture has been in this way absorbed he finds that the developer will flow nicely over the film without producing any marbled stains of reduced or metallic silver. Although these may be removed by brushing the film lightly under water with a camel's-hair brush, yet they always show imperfect development in the spaces where they occurred.

The same gentleman, speaking of the photo-chromic prints of M. Léon Vidal, which were shown to him when in Paris last May, says "this skilful amateur has attained in this application, of which he has all the merit, to a rare perfection." Dr. Nicol, in a recent contribution to this Journal, has been very hard upon some of these specimens which were sent to London for exhibition by Mr. Sutton, and he affirms that both that gentleman and M. Lacan have "much to answer for" for their praise of them; but if Dr. Nicol will refer back to Mr. Sutton's remarks he will find that he has only spoken in high terms of *one* specimen, which has never been exhibited and has never passed out of his own possession. In questions of this kind there will naturally be as much difference of opinion as there is amongst different people as to the merits of chromo-lithographs, oleographs, and other purely mechanical attempts at manufacturing coloured pictures. If they are only better than the attempts which preceded them that is so much gain, and we must not grumble if they have not *all* the excellencies of works of art which have a hundred or a thousand times their money value.

We learn also from the Count de Courten that the articles signed "Camille Lacan" in the *Moniteur* are by the wife of the editor. Happy man to have a wife who is an enthusiastic photographer, and so competent to help in his journalistic duties! But we suspected this to be the fact on the very first day of our acquaintance with the lady. It is pleasant, also, to be informed that M. Lacan is himself a bit of an adept both in oil and water-colour painting. The Count also speaks in high terms of the specimens of neôleo-peinture which were shown him by M. Puttemans.

M. Davanne is continuing his lectures on photography at the Ecole des Ponts et Chaussées, and in the last one reported his theme was the Taupenôt process, which he treated at considerable length and with much minuteness. We will give a *résumé* of his remarks in our next *Notes*. This process still holds its ground gallantly against all innovations, and we strongly suspect that the dry process so successfully employed by Mr. R. M. Gordon is only a slight modification of it. The whole subject is worthy of more space than we have to bestow upon it this week.

A monument to the memory of Frederic Sauvage, a Frenchman, the inventor of many curious things connected with art and science —for instance, a screw-propeller, a pantograph, a physonotype, a horizontal mill for sawing marble, a *soufflet hydraulique* for raising water, &c., &c.—was unveiled a day or two ago at his birthplace, Boulogne-sur-Mer. This genius, whose fate resembled in some unfortunate respects that of many other similarly-gifted enthusiasts— for he ruined himself, was sent to prison for debt, and ended his days in a lunatic asylum—was born in 1786, and died in 1857. His monument consists of a bronze bust placed upon a square pedestal fourteen feet high, with a suitable inscription. It was modelled by Mr. John Hopkins, an English sculptor residing at Boulogne, and was cast by MM. Thiebaut et Fils, of Paris.

The Photographic Society of Berlin assembled after the autumn recess last September. The meeting was not in some respects important, being chiefly occupied with examining pictures and samples which had been forwarded for the inspection of the members. One or two things were, however, discussed which have a passing interest. There was, for instance, a discussion as to whether a preliminary coating of albumen was better than one of india-rubber for plates. Herr Wilde, of Görlitz, wrote giving it as his distinct opinion that no advantage was gained by the change. He uses albumen plates always, and finds them perfectly dependable, and, with care, the solution of white of egg is no more difficult to prepare than one of india-rubber or benzoline, while a needless admixture of chemicals is avoided. The Chairman differed on this point from the writer, and held that caoutchouc was a more stable backing to the film than albumen, and rectified benzine did not impart an unpleasant smell. There was a pretty general chorus of approval of this dictum, several of the leading members stating that they had used the india-rubber gum with the best results. As our readers may remember, the solution recommended is of an exceedingly attenuated character, so that only the faintest shade of a deposit is left on the glass when the moisture is dried off. The advantage of such a method of preparing plates is that plates give cleaner images without so much heavy labour in preparing them, and that also the collodion film allows of greater freedom being taken with it in the several processes of the development. Various strengths are given for this solution, some recommending 1 to 1,000, others 1 to 1,500, and a member near Herr O. Lindner said that he had found one part of rubber to 3,000 of benzoline sufficient, only that the film was hardly held so firmly as with the stronger coating—a matter we should imagine to be very probable.

Another topic of some interest which came before the meeting was that of "satinising" machines. These, it will be remembered, were introduced into this country from America; but various forms of them have been in use on the continent for some time, and there, as here, many people have found difficulty in avoiding scratches from the plates. Mainly to obviate this disadvantage a Herr Voigt, in Homburg, has invented a modified hot roller or burnisher machine, which, together with hints, how to use it and all machines of the kind, he laid before the Society. His modification consists in having a movable instead of a fixed steel plate, so that when any dust gets upon it there is no difficulty in removing it so that it may be cleaned, or in turning it so as to present a new surface to the pictures. The plate is about five centimetres broad. He uses, also, another mode of heating, which would probably be found very handy by amateurs and those who had but a few pictures to burnish, and who did not care to go to the expense of "rigging up" a gas apparatus for keeping the plate hot. He can heat his machine either by means of a red-hot iron similar in principle to that used by laundresses, or by a spirit lamp. The facility for removal which the polished plate possesses gives it an advantage, too, when it has become dirty or scratched, because it can then be taken out at once and repolished with oil and rouge. In the case of scratches appearing when the burnisher is in operation, he puts a cardboard coated with white wax once or twice through the machine, whereby they become temporarily filled up; or, should it be merely dust on the surface of the plate, the wax catches it and so cleans the surface of the burnisher. Instead of soap—which is, we believe, used mostly in this country for machines of this kind, the pictures to be burnished being first rubbed with a solution of soap in spirits—Herr Voigt uses wax and a rag of flannel. This effectually cleans the surface of the sheet and predisposes it to take on a good polish. There is a difficulty that he also mentions in connection with these machines which, we doubt not, the readers of this Journal have also met, and that is the danger which exists in the case of mounts which have lines on them. The heat is apt to bring out any oil that may be in the ink forming these lines, and thus the plate becomes marked and transfers marks to successive pictures. The only way to get over that is, of course, to use plain mounts.

Some remarks were made as to the liability of satinised pictures to lose, after a year or two, the whole of their polish; but there was nothing definite given as to what the cause of this could be, unless it were damp. It will be worth the while of photographers in this country to make some observations upon the point.

Our Editorial Table.

PHOTOGRAPH OF TEMPLE BAR. By W. W. ROUCH AND CO.

MR. ROUCH, of the Strand, has favoured us with a magnificent photograph of a fast-decaying structure replete with historical interest—Temple Bar. He was fortunate enough to secure this picture when the structure had been only "nodding to its fall," and before it had become so dilapidated as to require the props by which it is now prevented from inopportunely succumbing to "the heavy hand of all-destroying Time."

This ancient structure, as may be known to many, was erected by Wren in 1670, and divides the City of London from Westminster. The gates, which are of oak, are usually shut when the Sovereign visits the city, when, after some old-world formality, they are opened. This ceremony has been traced to the time of Queen Elizabeth, when she visited St. Paul's Cathedral to return thanks for the destruction of the Spanish armada. The heads of persons convicted of high treason were, in former times, impaled upon the top of the gate, the last of these ghastly exhibitions taking place in 1772. Two niches in the west side contain the statues of Charles I. and Charles II. Up to a recent period the room above the "bar" was used as a store-room for the account books belonging to a neighbouring bank. It has become a matter of surprise that the structure should have been allowed to remain so long an impediment to the ever-increasing traffic which rolls between the eastern and western portions of the vast metropolis, until it has become, not simply a public inconvenience, but a dangerous nuisance. However, from its present tottering condition it is anticipated it will be speedily removed.

The picture was taken early in the morning before the traffic had commenced, and Mr. Rouch's fine photograph will be prized as an artistic and faithful memento of one of the most remarkable structural monstrosities appertaining to an earlier historical period of our metropolis.

PRACTICAL INSTRUCTIONS FOR PAINTING ON GLASS. By AURA L. London: LECHERTIER, BARBE & Co.

WITH respect to the value or advantage of colouring an enamel photograph we shall not here speak; it is enough to say that in the manual before us we have a valuable fund of information regarding the nature of ceramic colours, and also practical hints and directions respecting their application. Vitrifiable colours being composed of two parts—the colouring matter or metallic oxide, and the flux or vitreous matter which is the vehicle for the colour—we have in this little work much excellent information on this subject from both points of view. But the instructions given are in connection with enamel painting *per se*, and not for the colouring of vitrified photographs; hence the points likely to prove of special value to the photographic ceramic colourist must be deduced from the work itself. The author evidently possesses a most intimate acquaintance with the topics with which he deals.

TRANSPARENCIES FROM PHOTOGRAPHS OF THE GREAT PYRAMID. By J. POLLITT, Manchester.

WE here repeat what we have said on a former occasion, that Professor Piazzi Smyth, by his Egyptian campaign in 1865, successfully demonstrated the possibility of doing that which is slowly but surely effecting a revolution in the practice of photography, namely, the taking of negatives of a small size with an express view to their prospective use in the production of enlargements.

Possessing ample faith in the soundness of the principle, Professor Smyth armed himself with the most perfect appliances that could be obtained for producing pictures of the tiniest dimensions, and, with a camera capable of taking negatives an inch square, he laid the time-honoured Pyramids under contribution. The views thus obtained are now, for the first time, made accessible to the public, and in a form which renders them eminently useful—that of transparencies for the magic lantern.

We have been enabled, through the courtesy of Mr. J. Pollitt, the publisher of the transparencies, to examine a few specimens of this fine series, and are in a position to confirm all that has been said concerning their marvellous sharpness and educational value.

Respecting the origin of these works of the great past, Professor Smyth concludes the brief, yet interesting, descriptive remarks introduced in the catalogue of photographs of the Great Pyramid—of which there are forty-eight—with some observations on this subject. As interpreted, "not by profane Egyptology, but by accurate modern mathematical science," the Great Pyramid declares that its date of erection was 2,170 B.C.; the dispersion of mankind in 2,528 B.C.; and the Deluge in 2,800 B.C. It also gives the dates of religious events which were then future, but have since taken place, and have thereby justified this remarkable stone monument of prophecy. The learned author remarks:—

"How then, more than ever we must ask, or under what circumstances, or by whose agency, did such a building come to be erected?

"Historically, we are informed by Josephus that in the earlier ages of the world the sons of Seth, in antagonism to the descendants of Cain, did go down into the land of Siriad, or Egypt, and erect there a stone monument replete with astronomical truths which they had learnt by Divine assistance aiding them, and which monument could not have been any other than the Great Pyramid.

"We learn next from Herodotus that a Shepherd-Prince or Palestinian and Sethite Patriarch, with his people and flocks, abode in Egypt at the time of the building of the Great Pyramid—apparently to procure its erection; and he not only succeeded in that, but was enabled so to influence Cheops or Shofo, the Egyptian king of the period, that he both collected his people for the work (but at the same time closed all their idolatrous temples), and allowed no name of any of Egypt's false gods to be heard while the Pyramid was building.

"From Egyptian history, again, the information has come down that a Shepherd-King and his people, who could be no other than the above, after being long in the land, left Egypt in a body when the Great Pyramid was finished, and went into Palestine, 'where they built the city of Jerusalem and lived in it.'

"Whence, with other details gathered from the Bible, the conclusion is finally come to that the Shepherd-Prince, in the line of Seth, who abode in Egypt for a time only to see the Great Pyramid built, as a monument of inspired, prophetic, and other information received from the God of revelation, can be none other than Melchizedek, 'King of Salem, which is Jerusalem;' and to whom, in his honoured old age, even Abraham gave a tenth of the spoils. While the purposes for which the Great Pyramid was so erected are chiefly future, and indicated by Isaiah to be 'for a sign and witness to the Lord of Hosts in the latter day,' though exactly how, time only is likely to show to mere mortal man."

These transparencies, aided as they are by such intelligent descriptive comments, cannot fail to be much appreciated.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

THE first ordinary meeting of this Society for the session was held on Tuesday evening last, the 10th instant,—Mr. J. Spiller, President, occupying the chair.

The minutes of the previous meeting having been read and confirmed,

The CHAIRMAN said he was gratified in being able to announce that, in consequence of their united efforts, the Exhibition recently held had been successful, there being 103 exhibitors, including those competing for the Crawshay prizes. As a result, directly or indirectly, of that Exhibition the names of no fewer than nineteen candidates for admission into the Society would that evening be submitted. The

Exhibition was also successful in a financial point of view, as would be seen from a statement to be presented by the Treasurer.

Mr. T. SEBASTIAN DAVIS (Treasurer) briefly stated that the sum of £55 14s. had been received for admission fees and catalogues; that the rent of the hall for the Exhibition had been £30; and that this, together with the other expenses, would make up a sum of between £20 and £25 in excess of what was received—an amount of money which, in his estimation, could not have been better devoted than for such a purpose.

Mr. CHAMBERS inquired under what conditions coloured pictures had been admitted to the Exhibition contrary to regulations previously made known and believed still to exist, and why such conditions had not been publicly announced. Further: frames containing a certain number of *cartes* and cabinets had last year been proscribed, and, without any change of conditions, in respect of such, having been published, some had this year been admitted; and in the interests of the public he applied for information relative to these matters.

The CHAIRMAN said it was quite true that a few small coloured pictures had been admitted, but that had been inadvertently done by the Hanging Committee, who had, doubtless, considered that, in one case, the merits of the other uncoloured pictures in the same frame were such as to render inexpedient the rejection of the whole on account of the coloured specimens. But the Hanging Committee had drawn the line as tightly as possible, and had excluded many other coloured works. The admission of the few which had been exhibited might be considered as accidental rather than intentional. With regard to the number of *cartes* and cabinets no law had been that year laid down, nor any condition specially expressed with respect to them.

Mr. BIRD observed that no law had been clearly laid down for the guidance of exhibitors. The firm of which he was a member had prepared many pictures which had not been exhibited, and he thought it was very desirable that in future the conditions upon which pictures were to be admitted should be clearly stated.

The CHAIRMAN had no doubt that such would be done in future; but he would crave their kind indulgence for such little shortcomings as those referred to, for, owing to the circumstances under which the Exhibition was held, it was somewhat difficult to provide against every emergency. He would venture to say that such trifling lapses would not again occur.

Mr. B. J. EDWARDS requested some information respecting certain matters connected with the Crawshay awards. First, with respect to antagonistic statements which had been officially announced regarding the size of the heads, but more particularly with respect to an understanding that elaborate working upon a picture would disqualify it from receiving a prize, whereas, in the face of that, the prize had been awarded to a picture avowedly much worked upon by hand—an award that he and others considered had been manifestly unfairly made, and against which he protested.

The SECRETARY satisfactorily explained the circumstances under which the announcements respecting the size of the heads had been made; but said that the question of the legality of the award to Mr. Ferranti was one with which the Society had nothing to do, it being a question for the jurors appointed by Mr. Crawshay.

The following gentlemen were ballotted for and admitted members:—Sir Thomas L. Parkins, Messrs. A. W. Wilson, R. C. Murray, Alfred Ford Smith, J. M. Young, Wm. Nicholson, Vernon Heath, J. S. Catford, Henry Paget Swaine, F. M. Sutcliffe, D. L. Mundy, Edward Viles, J. C. Heavyside, H. J. Burton, Thomas H. Chaffin, William Street, J. W. Smith, John Hawke, and C. Ferranti.

Mr. John Chaffin then read a paper in which he described the circumstances connected with the production of the large portraits in the recent Exhibition, for which he had been awarded the first prize. [Mr. Chaffin's paper will appear in our next; but, in order to assist our readers in understanding the short discussion which followed, we may premise that, with one exception, the negatives had been taken by collodion prepared by himself; that it was made to a large extent from paper than from loose cotton; that a lens of twenty inches focus, by Jamin, with a diaphragm of three inches, had been used; and that the exposures given to the three large pictures had been, respectively, seventy, a hundred, and a hundred and twenty seconds.]

In reply to a question by Mr. Davis, it was stated that the soluble paper was not prepared by any one firm in particular, but was obtained from various sources.

Mr. GEORGE HOOPER said that the pictures of Messrs. Chaffin and Son had been much admired on account of their great softness and general definition, and he would like to be informed whether the back lens of the combination had been moved or unscrewed in any way so as to give the beauty and depth apparent in these pictures; he also wished to ascertain the distance between the sitter and the lens. He regretted that when he had written to Mr. Chaffin concerning the paper for their meeting that evening he had omitted asking him to bring up some of the negatives for inspection by the members.

Mr. CHAFFIN said that nothing had been done with the back lens of the combination in order to confer softness upon the negative. In Jamin's lenses there was a general diffusion of focus rather than particular sharpness in any one plane, which was favourable to the production of large direct heads. The heads, although seven inches in size, were rather larger than life size, and hence the distance between the lens and the face of the sitter was somewhere about four feet.

It having been stated by Mr. Chaffin that the developer he employed was composed, according to Mr. Edwards's formula, of ammonio-sulphate of iron and protosulphate of iron with a little sulphate of copper,

Mr. EDWARDS stated that the formula had been published in the almanacs.

With reference to the use of gelatine as a substratum,

Mr. CHAFFIN said that he preferred it to albumen on account of the greater probability that it would not injure the silver bath.

Mr. F. W. HART, however, thought that an albumen substratum, being entirely covered with collodion, was not likely to affect the bath.

Mr. H. P. ROBINSON considered that the lens used by Mr. Chaffin in taking the large portraits was not a good one, and recommended him to obtain in preference one of Dallmeyer's 7D lenses, by which a much shorter exposure than that mentioned would be required.

Mr. CHAFFIN replied that he had tried the lens just recommended by Mr. Robinson, and found that an exposure of one-half longer was required.

Mr. ROBINSON said that, when using the last-mentioned lens, he found that an exposure of from twenty to thirty seconds proved quite sufficient.

The PRESIDENT then proposed a vote of thanks to Mr. Chaffin for his paper.

Mr. Edward Viles, of Pendryl Hall, then read a paper *on Photography Away from Home*, which we shall publish next week.

Mr. BLANCHARD, referring to the method of conferring density on a negative by flooding it with a weak solution of iodine, as occasionally practised by Mr. Viles, said that a negative which was too thin at the beginning often acquired too much density after long use, owing to the silver abstracted from the paper combining with the iodine remaining in the negative.

Mr. S. FRY referred to the convenience of having a vehicle fitted up for photographing pictures away from home. His own was not exactly an omnibus like that of Mr. Viles—it more resembled a vehicle for conveying paupers to the cemetery; still it was very convenient. He used albumen as a substratum, and had long employed a wash of iodine as a means of intensifying, placing the negative in the light after the application of the iodine. In this way he obtained all the intensity required. As an effective means of washing negatives, and also prints, he recommended the use of a small rose jet something like that used by shampooers.

Mr. EDWARDS, when in America, finding that an albumen substratum was almost universally used, had tried it, but had not succeeded in obtaining any benefit by its use. He then bestowed extra care in having the plate perfectly cleaned, and that, when a suitable collodion was employed, ensured the adhesion of the film. He preferred applying his albumen after, rather than before, collodionising.

Mr. CHAFFIN said that a fruitful source of failure with an albumen substratum was to be found in the collodion being applied before the albumen had become thoroughly dried.

Mr. BEDFORD (in reply to a question by the Chairman) observed that they had never had any experience with a substratum; they always worked without any. They had used baths of glass, ebonite, and gutta-percha. Those made of gutta-percha answered well after they had been a short time in use. An ebonite bath had lasted for three years, and answered well during all that period.

Mr. FRANK HOWARD said that in his experience ebonite baths were thoroughly reliable. He was opposed to the use of a substratum.

Mr. HEDGES enjoined the necessity of preparing the substratum from perfectly fresh eggs.

Mr. SYDNEY SMITH applied the substratum by gently lowering down the plate in a flat dish containing just so much of the solution as not to flow over the back.

Mr. WERGE washed the plate under a tap, and, while the surface was still wet, he applied a solution of albumen—one part of albumen to thirty parts of water—by which an extremely attenuated film was left on the surface.

After some further observations, and a vote of thanks to Mr. Viles, the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE fifteenth annual general meeting was held in the Bible Society's rooms, on the evening of Wednesday, the 4th inst.,—Mr. James Ross, Vice-President, in the chair.

The minutes of the last general and previous ordinary meetings were read and approved of, and Messrs. William Nisbet, James Livingston, John Dick, John Eno, Robert Russell, and Charles Moxon were admitted as ordinary members.

The Secretary then read the following report of the Council for the past year.

ANNUAL REPORT.

IN presenting this, the fourteenth annual report your Council have much pleasure in congratulating the members on the continued prosperity of the Society. During the past year the Society has maintained its character as one of the most energetic and useful institutions in connection with photography.

During the year there have been held nine ordinary meetings, six outdoor meetings, and five "popular evenings"—all of which were well attended, and characterised by fully more than the average amount of enthusiasm and usefulness.

At the ordinary meetings the following papers were read:—

Experiences in Outdoor Photography. By Sergeant-Major Perry.

Progressive Results of the Past Session. By J. Nicol, Ph.D.

Action of Nitrate of Barytes on the Nitrate Bath (two communications). By Mr. J. G. Tunny.

On the Preparation of Permanent Sensitised Paper. By Mr. J. M. Turnbull.

Improved Lamp for the Sciopticon. By Mr. J. M. Turnbull.

On Polarised Light. By J. Nicol, Ph.D. Illustrated by Mr. Gilmour.

First Notes of Some Experiments upon the Effects of Sunlight on the Colours of Pigments, with Introductory Remarks on the Propriety of Photographic Societies Discussing Artistic Questions. By Mr. R. H. Bow.

Landscape Photography: Its Pleasures and Profits. By Mr. W. Neilson.

Remarks on Dry Plates, with Special Reference to Lieut. Abney's Beer Process. By Mr. W. H. Davies.

Spirit of the Journals (two communications). By Mr. W. H. Davies.

On the Beer and Albumen Process. By Mr. J. M. Turnbull.

Result of Experiments with Dry Plates Fumed with Ammonia. By Mr. W. H. Davies.

The five popular meetings consisted of—

Demerara and Its People. Lecture by Dr. Nicol.

Series of Views in North Wales. Lecture by Dr. Nicol.

India: Its People, Scenery, and Antiquities. By Dr. Hunter.

Series of Views of American Scenery. By Mr. W. H. Davies.

China and the Chinese. By Mr. J. Thomson.

The outdoor meetings were held at Winton Castle; Ravelston; Armisfield Park, Haddington; East Linton, Hailes Castle, Whittinghame, and Biel House; Colinton Glen and neighbourhood; second visit to Ravelston.

It will thus be seen that the Society has shown its usual amount of vitality, and done a good share of thoroughly practical work.

During the year the Society has been subjected to the usual fluctuation in the number of its members, thirty having seceded from its ranks, and seventy-four having been added to the roll, leaving a present membership of 277—showing an increase of forty-four members, the number last year being 238.

From the Treasurer's report it will be seen that the financial position of the Society is not, apparently, in a very satisfactory position. For this there are two reasons:—First, it has been the custom since the commencement of the Society to let the accounts not rendered until after the general meeting in November lie over till the succeeding session. This informality your Council consider wrong in principle, and have therefore included the whole liabilities of the Society up to date. Secondly, there has been a considerable exceptional outlay for apparatus, &c., in connection with the "popular evenings," which, of course, will not occur again for many years; and they have every confidence that the report of next year will show that the Society is in a healthy and prosperous condition.

The following donations have been received during the year, viz.:—From Messrs. Polton and Son, of London: Seventy-four photographs. From Sergeant-Major Perry: Six photographs. From Captain Horatio Ross: A carbon enlargement of *A Study of Dead Game.* From Mr. John Murray Gartshore, of Ravelston: Five volumes photographic journals; also, a handsome bookcase in carved oak—a portion of the library at Ravelston, supposed to have been designed by Sir Walter Scott. From the family of the late Mr. James Wood: An original copy of Rejlander's celebrated picture of *The Two Ways of Life.* From Mr. Henderson, of Montreal: Thirteen photographs. From Mr. Yerbury: Two photographs of *Biel House.*

Arrangements have been made for a series of "popular evenings," which your Council believe will meet with general approval, and they confidently anticipate that the future of the Society will at least equal its past.

The Treasurer also made the usual financial statement. and explained that the apparent deficit in the funds arose from an alteration in the termination of the financial year, and from an exceptional outlay in connection with apparatus, &c., for the "popular evenings."

Mr. Dobie, in rising to move the adoption of both reports, spoke at some length of the usefulness of the Society, and urged the members generally to take a greater interest in furnishing business for the ordinary meetings, as he was quite sure there was still room for much more real good being done in that direction. The motion was seconded by Mr. W. Hunter, and carried *nem con.*

The meeting then proceeded to the election of office-bearers for the incoming year, with the following result, which was carried by acclamation:—*President:* Dr. John Thomson.—*Vice-President, Junior:* R. H. Bow.—*Treasurer:* Thomas Pringle.—*Hon. Secretary:* E. R. Yerbury, 3, Hanover-street.—*Corresponding Secretary:* Dr. John Nicol, 4, Dundas-street.—*Auditor:* A. T. Niven.—*Lecturer:* Dr. John Nicol.—*Council:* R. G. Muir, Alexander Mathison, David Aird, John Bashford, and James Howie, Jun.

On the motion of Mr. W. H. Davies, seconded by Mr. Panton, it was agreed that candidates for admission as ordinary members be required to lodge with the Secretary the amount of their annual subscription along with their application, such sum to be returned in the event of their non-election.

Dr. Thomson, in thanking the members for his election to the office of President, said he could not congratulate them on the choice they had made, for he felt, and very painfully too, his own unfitness for the office, and he was persuaded that they might have made a much better selection from among the other members of the Society. When he looked around he could point out several who were men of talent, with refined taste and cultivated intellect, and who combined with those qualifications an ease, grace, and pleasantry in giving expression to their thoughts, with the happy knack of being able to throw in a touch of humour on fitting occasions, so as to soften the hardness and rigidity attendant on scientific discussion—just as the photographer would, by an experienced and artful touch, soften down his picture when the contrast of light and shade was too strongly marked. Those members had also an intimate acquaintance with photographic literature, and possessed an extensive knowledge of those sciences on which were based the principles of their beautiful art, as well as having shown great manipulative skill and dexterity in working out the details of the various practical processes. But the choice had been made, and it then rested with them to make the best of a bad job. On his part he promised to place himself entirely at the service of the Society; and he hoped that with the co-operation of, and the assistance which he expected to receive from, the able staff of office-bearers (who were really the working men), he would be able to pull through the coming year. He was the more encouraged to hope for that favourable result from the experience which he acquired when attending their meetings last year. He had then the satisfaction and gratification to witness that their general business and discussions were conducted in a quiet, orderly, and gentlemanly manner, giving no occasion for the interference of the President, but rendering his office almost a sinecure. He hoped that there might be as little reason for action on his part during the session on which they had entered. He trusted all of them would put forth a strong effort to advance the progress of their favourite art, and, by contributing largely to the general fund of photographic knowledge, not only to maintain the Society in the high position which it had taken among the kindred institutions of this country, but to raise it a step or two higher in the scale of excellence and rank.

Mr. Yerbury then said he thanked them for the confidence reposed in him by placing so much of the Society's interest in his hands—an honour he should strive to merit by careful attention to the duties devolving upon him. He entered upon the task of the secretaryship with some timidity, knowing the very large amount of work that was involved in it; but he intended to go forward in the confidence he carried with him and his fellow office-bearers, of whose co-operation he felt certain, from the experience of the past, while he was a member of Council. He trusted, therefore, with their kind support, to fulfil the duties to the satisfaction of the Society.

Votes of thanks were then given to the retiring office-bearers and the Chairman, and the meeting was adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The ordinary monthly meeting of the board of management was held at 174, Fleet-street, on Wednesday, the 4th instant,—Mr. Ganly in the chair.

After the minutes of the previous meeting had been read and confirmed, Mr. J. B. Hall was elected a member of the board, *vice* Mr. Bird, elected chairman.

The relief sub-committee reported that they had, according to instructions, met the applicant referred to in the previous report, and, after satisfying themselves that the facts were as stated, paid over the £5 voted at the last meeting.

The question of offering remuneration to local secretaries was again discussed, it having been adjourned from one of the previous meetings. It was resolved—"That, in order to induce photographers in the provinces to undertake the duties of local secretary, a commission of £10 per cent. be allowed upon all subscriptions and donations collected by them."

The Secretary announced that the following gentlemen had promised donations of photographs for the art-union distribution:—Messrs. Bedford, Blanchard, England, Hubbard, J. M. Young, Fradelle and Marshall, A. and G. Taylor, Spencer, Sawyer, Bird and Co., A. Ford Smith, H. Whitfield, F. M. Sutcliffe, J. Brier, J. A. C. Branfill, Lieut.-Col. Roche, S. and E. White, B. J. Edwards, F. Howard, J. Werge, Rouch and Co., Russell and Sons, E. Fox, and A. and J. Bool—so that there was every indication of a very successful drawing.

The meeting then proceeded to consider the place and time of the general meeting and to determine the form of such meeting. Upon this subject an interesting discussion took place, the board being unanimously of opinion to endeavour and combine business with pleasure. Most of the members present were able to promise help towards an entertainment, and it was decided that at the general meeting to be held in January next, after the transaction of the business, election of officers, &c., the meeting should hold a *conversazione*, the prizes in the art-union distribution to be then exhibited, and that there be a lantern exhibition and a musical entertainment, to be provided by members and friends. Each art-union ticket was to include admission to the meeting as well as a chance in the drawing. The Secretary was instructed to find a suitable place for the general meeting.

Mr. Ganly then vacated the chair and tendered his resignation as deputy-chairman, on account of having accepted an appointment in India.

The Secretary expressed his regret at losing Mr. Ganly, who had been connected with the Association since its commencement, and had done his share in getting it established. He hoped that the members would pass an unanimous vote of thanks to Mr. Ganly, and wish him every success in his new position. This was passed with acclamation.

Mr. Ganly briefly thanked the members for their kind wishes, and said that, though he had resigned his office as deputy-chairman, he would still remain a member of the Photographic Benevolent Association.

PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the September meeting of this Society, Mr. Chisholm in the chair, Mr. H. J. Newton read a paper on *A Rapid Dry-Plate Process.* [See page 542.] At the close of the paper—

Mr. Mason said: Before Mr. Chapman went into the country I called one evening at the Rutherfurd Observatory to close up some astronomical work, and found him experimenting with collodions with the actinometer he exhibited here some years ago. Among the samples he was trying was a collodion containing a chloride, according to a formula given by Mr. Newton. He did not tell me the exact formula, but he found that the collodion was not as sensitive as that which he used for star work.

The President: I am not prepared to say that for indoor work the chloride is as advantageous as it is for dry plates. Whatever collodion Mr. Chapman may have been trying he uses a collodion very near that formula without the chloride, and he uses no iodide or bromide except cadmium. The proper way to test it would be to make a collodion with the same chemicals, some without the chloride and some with it, and, when trying the two, to float the plate half with one sample and half with the other and expose them together.

Mr. Mason: This method of working with the scale I consider an important test. It will be remembered that, some years ago, I read a paper, in which I claimed that we must fall back upon artificial light, where we can get a constant amount of actinic force, because there are changes on a perfectly clear day, caused by varying strata in the atmosphere containing absorbents which change the nature of the light materially.

Mr. Parkhurst: How rapidly would such changes occur?

Mr. Mason: Within a very few minutes. I have observed a very material change in the course of five minutes.

Mr. Parkhurst: I have found, when making photometric observations of the stars on evenings which apparently were perfectly clear, that there would sometimes be very appreciable changes in their brilliancy in the course of a few minutes.

Mr. J. B. Gardner: I have tried the collodion from the formula given, and it worked quicker than the collodion I had been using, and, consequently, I have used it ever since. I did not in any instance use iodine, but found that the collodion invariably changed its colour to a certain extent, and there was no need of colouring with iodine.

Mr. Thomas: If your cotton were fumed you would require the iodine.

Mr. Gardner: If the colour is light it works well. It is a light straw colour, and grows darker.

The President: I have some which has been made nearly a month, and it is as white as water.

Mr. Chisholm: The way I have been in the habit of making my collodion is to dissolve the cotton in ether and alcohol, reserving a certain portion of the alcohol for dissolving the salt—the iodide or the bromide. They keep perfectly white for a year in that way; but when put together, the next day they are straw colour, and keep growing darker. I inquired of Mr. Anthony the cause of this, and he said that if you dissolved cotton in alcohol and ether it would in time become acid, but would not show it until you had put the iodide with it. It keeps turning red after putting them together.

Mr. Thomas: It ought not to do so with cadmium.

Mr. Chisholm: I used Anthony's No. 1 cotton; the ether was made expressly to order for me, and there was no alcohol with it.

Mr. Thomas: If you want to keep it colourless you can do so by putting a strip of metallic cadmium into it.

Mr. Mason: I noticed in a recent communication from Dr. Vogel that he had given a formula for collodion which he had used successfully for some years, and he received a letter from an eminent photographer who had used the formula and had been successful with it. In corroboration of his statement he sent plates which Dr. Vogel stated were enough to have made a man blush for having recommended such a thing. The gentleman sent him other plates, which were very brilliant, made in exactly the same way except the collodion. Soon afterwards Dr. Vogel met this gentleman, and found that his method of iodising the bath was by dipping the plate and letting it stand over night, which was sufficient for his own collodion, but not for Dr. Vogel's formula. Dr. Vogel mentions this as an important item. He iodises his bath by forming iodide of silver and adding it to the solution.

Mr. Thomas: I never think of such a thing as iodising a silver solution.

Mr. Mason: I always add an amount of iodide of silver. I have tried the method of iodising the bath with the plate, but never found it to work as satisfactorily.

The President: When I make a new bath I add the iodide of potassium to the solution.

Mr. Thomas: I do not think I make a new bath once in seven years. I use it pretty acid. I find that a silver solution will always correct itself. The iodide of the plate is down in the bottom of my bath, where it is like mud.

Mr. Mason: I take pure metallic silver and add to it a sufficient amount of nitric acid to dissolve it; then add to that water enough to make it the strength I desire; then put it in the evaporating dish, and boil it; then I filter it and render it acid by the addition of nitric acid, put it in the bath, and I am ready at once to go to work.

Mr. Thomas: If the bath be new it will work too rapidly. I never found my bath out of order.

Mr. Mason: Can a silver solution that has never had iodide of silver in it be used to make a negative?

Mr. Thomas: Yes; I make it bran new, and never think of such a thing as putting in iodide of silver. In making collodion, if you do not put the bromide in first it will not do for me. I would never use a drop of water that was not boiled.

The President: I have directed in my formula that the bromide should be put in first.

Mr. Chisholm: The bromide of potassium always worked clearer with me than any other bromide.

Mr. Mason: When I commenced working the collodion process in 1854 we were very careful when adding water to the collodion not to put in more than was necessary. Afterwards, I made a series of experiments with collodion to which I added as much as four ounces of water to twenty ounces of collodion, and made a perfectly homogeneous film, which would bear examination under the microscope. I was surprised at the amount of water which could be used in collodion and get a beautiful film. On the other hand, collodion with very little water in it will sometimes give a very bad reticulated film.

Mr. Thomas: The cotton was made at a very high temperature, and you cannot use much water with that. I use cotton made at a low temperature.

The meeting was then adjourned.

Correspondence.

"PREPARED ALBUMEN."

To the Editors.

Gentlemen,—In reply to numerous correspondents as to prepared albumen, the following is the method I adopt:—

The albumen of a dozen eggs is beaten to a froth, with half-an-ounce of Beaufoy's acetic acid and four ounces of water. This is allowed to stand for twelve hours, when it is strained through fine muslin. Strong liquor ammonia is then added until the mixture is decidedly alkaline, after which it is placed in a stoppered bottle for use.—I am, yours, &c.,

November 10, 1874. E. Dunmore.

THE SENSITIVENESS OF IODIDE OF SILVER.

To the Editors.

Gentlemen,—Not wishing to seem discourteous, especially as Mr. Sutton writes in so friendly a spirit, I desire to make a few remarks in reply to his letter on the above subject in your issue of the 6th instant, though it certainly seems a waste of time and a tax on your valuable space to reply to criticisms which have evidently been made before Mr. Sutton has tried my process, and, furthermore, are based upon a misconception of what I wrote.

Mr. Sutton writes:—"He confesses to having used a *bromo*-iodised collodion." Well, I have, certainly; but where the confession is to be found in my paper I am sure I do not know, as I directed that a *simply iodised* collodion should be used, merely remarking parenthetically that an ordinary commercial bromo-iodised collodion might be made use of without materially affecting the result. And with regard to the treatment with a solution of common salt, I also stated that a soluble bromide or *iodide* might be substituted (though at the same time I pointed out why I prescribed a soluble chloride), and this, I suppose, Mr. Sutton has overlooked.

It was, perhaps, natural under the circumstances (my name being entirely unknown in photographic literature) that Mr. Sutton should assume, as I presume he does, that I am some mere tyro in the art, who, imagining that he has discovered something, forthwith rushes into print. But, before writing anything further on the subject, Mr. Sutton will perhaps be good enough to try the caustic potash developer on films prepared in any way he thinks best, so as to ensure their freedom from any kind of silver salt except iodide (having a due regard to what I have said as to the effect of soluble iodide in destroying sensibility and retarding development), and then report the result.—I am, yours, &c.,

Liverpool, November 9, 1874. William Robinson.

P.S.—I, of course, accept Mr. Sutton's explanation of his views as to the necessity of using free nitrate of silver in connection with iodide films, though this is not exactly what he wrote in your number for 10th July last, page 326.—W. R.

TRANSPARENCIES IN THE EXHIBITION.

To the Editors.

Gentlemen,—Will you allow me to correct an error in your mention of the coloured transparencies exhibited by us, which, you say, "have not even the pretension of being executed on a photographic base." The slides are all without exception executed on a photographic base, which is, however, purposely so delicate as not to interfere with the perfect transparency and brilliancy of the picture, while giving accuracy of detail.

Had the transparencies been "*only* paintings" we should naturally not have sent them to a photographic exhibition.—I am, yours, &c.,

Royal Polytechnic Institution, Nov. 9, 1874. Jane Davison.

[The coloured pictures to which we alluded were some, if we recollect aright, which indicated scenes in the tragic history of the death of Cock Robin, or in some similarly veracious historical record. Whether coloured magic lantern pictures of this class—even if painted upon an outline photographed on the glass instead of being drawn by hand—be legitimate subjects for a photographic exhibition, from which all coloured work, even if the photography were from *nature*, was to have been rigidly excluded, must still remain a matter of opinion.—Eds.]

KENNETT'S PELLICLE.

To the Editors.

Gentlemen,—No doubt many of your readers will be glad to hear of any experience with the above dry-plate process, so without further preamble I will state the result of my first attempt.

I felt perfectly satisfied with the results Mr. Kennett was kind enough to show me, both as regards the negatives and prints taken from them; I was only anxious to test the "pellicle" for *rapidity*. I first took a group out of doors, in the middle of last month; the morning was not very bright, although the sun was shining through thin clouds. The lens used was Dallmeyer's No. 2 B, with No. 4 stop. I first exposed one of the "quickest commercial dry plates in the market," giving an exposure of three seconds for one picture and five seconds for the other. I then exposed a plate coated with Kennett's pellicle, allowing two seconds' exposure on each picture. These plates were developed the following day. The first-named plate had not received a sufficient exposure by a long way—eight to ten seconds would have been nearer the mark; the pellicle was amply exposed.

On another occasion I tested the sensitised gelatino-pellicle against a wet plate in my glass room, in which there is never such a flood of light as one commonly sees in most photographic studios. I gave ten seconds' exposure to the pellicle and twenty-three seconds to the wet plate, using the same lens as before with No. 21 stop. Both negatives were sufficiently exposed.

I may add that on the same day I took the photograph of the group out of doors a friend of mine was taking negatives by the wet plate process, under similar circumstances, with a Ross's *carte* lens, 21 stop; the exposure necessary was sixteen seconds.—I am, yours, &c.,

November 10, 1874. A Portrait Painter.

P.S.—Since writing the above I have had another opportunity of trying the sensitised gelatino-pellicle *dry* plate with a collodion *wet* plate. The sitter was a fair-haired child, seven years of age, draped in black velvet. No. 1. The first pose was with a wet collodion plate; in two seconds the child had moved and I capped the lens. No. 2. I then exposed a pellicle dry plate for two seconds. No. 3. After this, finding the child very docile, I used the head-rest, and gave eight seconds' exposure with a collodion *wet* plate. No. 4. Then I put a sensitised gelatino-pellicle dry plate into the dark slide, and exposed it for seven seconds. Now for the results:—No. 1. Scarcely any image. No. 2. Not sufficiently exposed, but still there was a picture and a faint trace of the light on the velvet dress, as well as a stronger indication of the braid on the coat. No. 3. Not sufficiently exposed; not a trace of light on the velvet, nor any sign of the braid. No. 4. Fully exposed; the velvet dress full of detail, and the light yellow hair well expressed. All my experiments prove to me—first, that we have now (thanks to Mr. Kennett) a dry-plate process which is at *least* twice as quick as the collodion wet-plate process; second, that the preparation of these dry plates is exceedingly simple and inexpensive; and, third, the development and other manipulations are unusually free from difficulties.—A. P. P.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—The preliminary meeting for giving the above Society a veritable existence will take place on Monday next, the 16th inst., at seven p.m., at the New Inn, opposite the Town Hall, Bradford.

I had to settle upon some central position in Bradford, and the above place was thought the most convenient as an initiatory step until private rooms could be obtained. This explanation is, perhaps, necessary to the Good Templars who may be found amongst the intending members.—I am, yours, &c., J. W. Gough.

Akroydon, November 10, 1874.

FUMING PAPER.

To the Editors.

Gentlemen,—Last week I gave you my experience on this head, which, it appears, has been cavilled at by Mr. T. P. Smith, your American correspondent, and styled by him as "nonsense." I use Newman's diamond varnish. The ammonia is of No. 2 strength—*not* the liq. am. fort., to the vapour of which I should be sorry to expose my paper for the time he states.

I can only say that, being quite satisfied with the fuming I have stated as given by me, I do not intend to change. My paper smells strongly of ammonia when taken out of the box. I like to be "all right" with my proceedings rather than to "go ahead;" and I would recommend to my English *confrères* the old motto—"*Medio est in tutissimus ibis.*"—I am, yours, &c., Wm. Harding Warner.

Denbigh, North Wales, November 7, 1874.

Miscellanea.

Guy Fawkes among Cambridge Photographers.—On the anniversary of Guy Fawkes' Day in Cambridge, squibs and crackers were exploding in all directions, but amusement was tempered with discipline, and it was hoped that all had passed off well. About half-past eleven, however, it was discovered that the premises occupied by Mr. Farren, artist and photographer, of 2, Rose-crescent, were on fire. It was soon evident that the matter was serious, and that destruction was threatened to the surrounding densely-packed house property. The fire-bell was rung from St. Mary's, and, under the direction of the Senior Proctor, a large body of undergraduates set to work with a will. The fire raged up till about four o'clock. It was found that the hose of the town engines were perfectly useless, as they would not fit the hydrants of the Waterworks Company, and much valuable time was lost thereby. The total loss, according to the present estimate, approaches £3,500. Mr. Farren was insured in the Sun fire office to the extent of £2,000.

A Provincial Newspaper on the Crawshay Prizes.—Mr. Robert Crawshay, Cyfarthfa Castle, has again offered handsome prizes to stimulate competition in various branches of that art in which he is so successful and enthusiastic an amateur; and these competitions constitute the most distinctive feature of the exhibition, comprising as they do direct portraiture, enlargements, and landscape. Mr. C. Ferranti, Bold-street, Liverpool, obtains the Crawshay prize (£25) for the best portrait enlargement, of which he shows four examples; and his success is the more complete as he does not contend in any other class, and has no failures to set off against his triumph. These enlarged portraits are so exquisitely artistic that an unprofessional critic would be rash to say which is most perfect of the four. The highest qualities one can perceive in photography are attained in Mr. Ferranti's delicate sense of finish. Mr. Crawshay is himself a competitor in the class for seven-inch heads taken direct from life, and the judges have awarded him the second position; for, of course, he could not accept a money prize contributed from his own pocket. The landscape competition has produced some choice and charming examples, Messrs. Robinson and Cherrili, Tunbridge Wells, taking the first place. Messrs. Vandyke and Brown are, of course, represented in the exhibition, showing three half-length portraits in the class of direct enlargements, theirs being done on opal glass by development—very pleasing effects—and also three enlargements in carbon, slightly retouched. Mr. Young, Llandudno, sends very creditable exhibits in portraiture; and Mr. T. Edge, Preston, has a unique enlargement in—yes, in portraiture, also—the *Donkey that Wouldn't Go* being artistically represented caressing her foal.—*Liverpool Courier.*

Indecent Prints.—At Bow-street Police Court, on Monday last, William Burton was charged on a warrant, before Mr. Vaughan, with selling indecent prints, photographs, &c., at 32, Holywell-street. Mr. Collette prosecuted on behalf of the Society for the Suppression of Vice; Mr. Pulk defended. Mr. Collette having introduced the facts of the case, called Police-constable Cox, who stated that, on the 4th inst., he went to the above-named shop with another person, both in plain clothes. He there saw the prisoner. The man witness was with asked for the goods he had already ordered. The prisoner asked whether witness could be trusted, as he had to be very strict, for it would not do to serve anyone. They were then shown upstairs, and the prisoner brought in twenty or thirty books. One was selected from these books, all of which were of an indecent character. [This book was produced.] £3 was asked for this book and paid by witness and the other man. Before leaving the shop witness gave orders for £23 worth, and promised to call for the "goods" on Saturday. On coming out of the shop they proceeded to Charing-cross, where witness handed the book purchased to Inspector Harnett, whom they met there. On Saturday witness returned to 32, Holywell-street. The prisoner was still there behind the counter. He showed witness into a private room, and fetched some books; and while he was looking at them Inspector Harnett and several others came in in plain clothes, and witness, together with the man who had introduced him, left.—Mr. Pulk asked the name of this man, but, on Mr. Collette's objecting, Mr. Vaughan disallowed the question;

whereupon Mr. Pulk urged that if the prisoner were to be convicted upon the unsupported evidence of one man, and he a police-constable, we were going back to the days of Titus Oates.—Mr. Vaughan replied that Mr. Collette assured him there was good reason for the name not being divulged, and, therefore, he (Mr. Vaughan) should not allow the question. Any objection to this course might be taken at the trial.—Peter Harnett, Inspector, deposed that he had instructed the last witness to act as he did. He received the book above mentioned, at Charing-cross railway station. He afterwards obtained a warrant from this Court on Friday last, and on Saturday, between twelve and one o'clock, together with Detective-Sergeants Kerley and Chamberlayne, and Detective Marshal, he proceeded to 32, Holywell-street, where they saw the prisoner, the last witness, and the other man with the book (produced) before them. Sergeant Kerley handed witness some negatives, which he said he had found at the bottom of the house. The prisoner asked who saw him find them, and a woman who had gone down with Kerley said, "I did." The prisoner afterwards said that the negatives were brought there by a man named Harrison, about a fortnight ago, for safety. The negatives were examined, and most of them were of a disgraceful character. There were 91 glass negatives. Witness had known the prisoner for some time by the name of White.—Sergeant Kerley, detective, E Division, stated that in consequence of instructions received from Superintendent Thomson he went, with Inspector Harnett, to 32, Holywell-street, on Saturday last. He went downstairs, accompanied by a woman, who was told by the prisoner to go with witness, and there, in a cistern in the kitchen, he discovered a false bottom, and in it a number of negatives—those produced.—This concluded the case for the prosecution.—Mr. Pulk raised several objections, but Mr. Vaughan said they must be urged before the jury at the trial, as he considered there was sufficient evidence to make out a *primâ facie* case.—The prisoner was then fully committed for trial, and Mr. Vaughan said he would accept substantial bail—the prisoner in £500 and two others in £250 each.

EXCHANGE COLUMN.

A well-constructed studio, very portable, will be exchanged for a piano.—Address, C. F. J., 3, Bloomfield-road, Burdett-road, Bow.

A Swatman's *ne plus ultra* accessory, new, will be exchanged for anything of equal value in photographic apparatus. Cost £5 5s.—Address, H. Dunbar, 74, Paradise-street, Liverpool.

Cassell's *Popular and Technical Educators* and Macaulay's *History of England*, 5 vols., is offered in exchange for a large gas bag and lantern slides.—Address, J. Knight, 14, Alliance-street, Darlington.

ANSWERS TO CORRESPONDENTS.

Photographs Registered.—

William Hanson, Leeds.—*Two portraits of the Rev. Samuel Adams.*

A. Copsey, Sudbury, Suffolk.—*Photograph from Cartoon entitled "Candidates for Town Council Men."*

R. Thompson, Liverpool.—*Photograph of Man and Ass, entitled "When Shall We Three Meet Again?"*

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

A. G. Grant.—Can you not compress the note somewhat? At present it is too long.

J. J.—Of the two lenses, that having six inches focal length is undoubtedly to be preferred.

H. Potter.—Please to give us some clue as to the time when the article in question appeared. We have no recollection of it at present.

A Fulhamite.—Since the process was published in our Journal a few years ago no material improvement has been made to warrant a second publication.

J. P. (of S.).—Copal is somewhat difficult to dissolve in alcohol. The method we adopt is to crush it, and place it in a bottle with about twice its weight of alcohol. After twenty-four hours it is well shaken up and more alcohol added.

W. B. A.—It is always unwise to use a hyposulphite bath a second time. The best way for you to proceed is to make a large quantity and use a little of it at a time, throwing it away when done with. The stock solution will remain good for an indefinite period of time.

James Hall.—The sensitiser for blue-coloured pictures, such as you have enclosed, is, doubtless, one or the other of the exciting agents we described in the course of a brief series of articles on printing by the ferric salts, which will be found in some of the numbers of the Journal issued during the early months of this year.

Tyro.—If a little creosote or carbolic acid be added to the gelatine decomposition will be prevented. Oil of cloves is frequently used for the purpose; the peculiar odour of this oil may frequently be detected in common writing-ink, to which it is added to prevent the decomposition of the gum that is present to give body to the ink.

P. Q. (Dysart).—1. The only suggestion we have to make relating to the *carte* enclosed is that it could be much better vignetted. A little more shadow on the face would also be an improvement.—2. The size of landscape camera we would recommend must depend entirely upon circumstances, and may range from a quarter-plate up to 24 × 13 inches.

D. J. A.—The pseudoscope is an instrument for effecting the conversion of relief. It is composed of two rectangular prisms, by means of which the relative direction of rays reaching the eyes is inverted. Hence, a ball will appear a hollow; an object which our other senses tell us is distant will, by our sense of sight, appear as if nigh; concavity becomes convexity, and *vice versâ.*

Auchterarder.—1. We presume that the "pneumatic" gas and "air gas" processes are intimately allied. If so we have already published a full account of it.—2. We are not sure of any address at which you would obtain powdered talc. We understand, however, that it is an article of commerce.—3. In practising the enamelling of *cartes* do you not use a substratum of collodion? You speak of the *gelatine* adhering to the glass, which could scarcely be the case if the operations were properly conducted.

Geo. B. Scott.—The green colour of the nitrate of silver solution arises from the presence of nitrate of copper. The silver coin of the realm contains an eleventh part of copper to impart hardness to it, and it is to this copper that the objectionable colour is due. We do not, however, imagine that it will affect your working, even in the slightest degree. But the copper may be got rid of by heating the crystals to fusion, by which the copper will be oxidised. If now the fused mass be dissolved in distilled water the copper will be found at the bottom as a black powder, leaving only the silver in solution.

Utrecht.—We scarcely understand your meaning as to the silvery deposit on your plates. Such a deposit on the shadows or clear parts of the collodion picture indicates that either the collodion or the silver bath is out of order, the bath probably containing a little organic matter; but if, on the other hand, the silvery deposit is on, or rather forms, the opaque portion or whites of the picture it arises from another cause. In developing with protosulphate of iron the appearance of the deposit is much influenced by what is mixed with the developer. For example: a mixture of nitric and acetic acids will give a white deposit free from metallic lustre; sulphuric acid will cause the deposit to have a thorough metallic sheen, something like tinfoil; and so with other substances.

X. Y. Z.—We have always spoken favourably of the principle of patents; it is only in individual cases that we have expressed disapproval; and we have invariably coupled with such expression of disapproval our *reasons* for it. The principle upon which patents are granted is both just and good; but we frequently counsel our correspondents not to patent certain inventions, on the grounds, usually, that such action on their part would not only prove no gain, but involve much loss to them. What determines whether an invention is a subject for a legal patent is that it will, or is likely to, prove of "great public utility;" that the applicant is the "true and sole inventor" thereof; and that the invention has never before been published. This last clause does not prohibit an applicant from obtaining a patent; but it is a well-recognised axiom in patent law that prior publication renders void any patent.

Received.—Rev. T. F. Hardwich; G. W. Webster, F.C.S. In our next.

Cameo Masks.—We have received from Messrs. Rivot and Fontés some very effective masks, introduced by Mr. Fontés, for embellishing photographs. The designs are printed on paper, in which is then punched an oval, cushion, or other shaped aperture, and which is now pasted upon the portrait. By means of one of the usual embossing cameo dies the relief is given in such a way that the junction between the mask and the picture and the plain and raised parts coincide. The effect is exceedingly good, especially when, as in some of the specimens before us, the photograph has been enamelled and the mask, or ground, is plain and granulated.

METEOROLOGICAL REPORT,

For two Weeks ending November 11, 1874.

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

These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
29	29·94	E	52	53	58	49	Raining
30	30·06	E	50	51	54	46	Raining
31	30·27	E	50	52	54	47	Dull
Nov.							
2	30·12	E	47	47	55	42	Dull
3	30·11	E	46	46	59	42	Dull
4	30·19	W	43	44	—	38	Foggy
5	30·12	E	50	50	57	38	Foggy
6	30·21	W	55	55	61	45	Dull
7	30·41	NW	46	49	55	44	Cloudy
9	30·39	SW	44	46	58	35	Cloudy
10	30·10	W	49	51	54	45	Dull
11	30·17	NW	53	35	—	29	Frosty

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 759. Vol. XXI.—NOVEMBER 20, 1874.

SOFTNESS.

A trivial thing occurred at the meeting of the London Photographic Society last week, on the occasion of Mr. Chaffin's describing how he took his prize pictures, which involves a matter of principle in connection with the use of lenses, especially when lenses are used for the purpose of taking what is known as "direct large heads." A subject of this kind is exceptionally trying in connection with the optical portion of the operation; for the various planes of the subject to be photographed are, in effect, situated at a far greater distance from each other than is the case with landscape work. "In effect," we say; for when the large aperture that must necessarily be used is estimated, and also the distance between the several parts of a face or a head in front of the lens situated in different planes, but which must, behind the lens, be brought to a focus on one plane—that of the sensitive plate—when such conditions on one hand are contrasted with the production of a landscape on the other, in which a very small aperture is used in the lens, we make bold to assert that there is a greater difference, *in effect*, between the eye and the nose on the face of a sitter than there is between a tree situated at a distance of twenty yards and any other object ten miles away. Portrait lenses, no matter by whom made, so long as they are constructed on right principles, fulfil in a wonderfully-accurate manner the purpose for which they were made, that purpose being to take a portrait of a person placed at a moderate distance from the camera —say twelve to twenty feet.

When the sitter approaches nearer than this, especially in large sizes, the portrait combination of lenses must then be changed in form; for, if a lens be so constructed as to give a perfect image of an object, or sitter, when placed at what is termed "a distance," it becomes evident that, as the sitter approaches to the lens the form of the latter must be changed. We shall assume that every reader knows the construction of a portrait lens, and is further aware that what is termed the front lens must be placed next the object to be reproduced. But here another question intervenes. If a combination be made so as to necessitate the anterior element in the picture — in other words, the sitter — being placed at a considerable distance from the lens, the other element—the image on the sensitive plate—being at a much nearer distance from its plane of delineation, it is very evident that, if these two conditions be assimilated, so must the construction of the lens be varied. The nearer the object in front is approximated to the lens the farther from the lens must the ground glass or sensitive plate be placed. Portrait lenses are *all* constructed in accordance with these conditions; hence a portrait lens fails to delineate the image sharply when the object in front is in too close proximity. The instant a portrait lens is employed to produce an image larger than the original it is entirely out of place; for the front lens must then become the back lens, and to ensure this it is necessary to reverse the combination completely.

A portrait lens, as at present constructed, must be used either for producing a picture smaller in dimensions than the sitter or larger. If the former, what is known as the front lens must then be turned towards the sitter; but if the latter, the lens must be reversed, and if not so reversed there will be no sharp focus, but only definition of the character mistakenly termed "diffusion of focus." By no amount of aberration can the thing itself—that is, depth of focus—be introduced, such a condition being only a matter depending upon the acuteness of the angle of rays emanating from the lens. Perfect definition apart from this is mathematically impossible.

When Mr. Chaffin, at the last meeting of the London Photographic Society, gave certain statistics respecting the lens he used in the production of the portrait for which he was awarded the first Crawshay prize and the distance at which it was placed from the sitter it was evident, by a very simple arithmetical calculation, that he was using the wrong end of the lens to the front; for, when using a lens of twenty inches *back* focus and, therefore, presumably twenty-five inches *equivalent* focus in producing a sitter's head which turned out to be rather larger than it was in nature, and the original of which was situate about four feet from the lens, a very small amount of arithmetical knowledge, indeed, shows us that he was in effect using his lens completely reversed in position. Mr. Hooper thought the resulting pictures were singularly soft. Those who desire such a quality need only have their lenses inverted as respects the position in which they should be, and such softness, fuzziness, diffusion, or whatever other more appropriate designation may be used, will invariably result. In the optical sense of the term no such thing as "diffusion of focus" can possibly exist. What can be, and is, done, however, is to create such optical conditions as to destroy all sharp, crisp definition, thus abolishing the standard of comparison.

When the sitter and the ground glass are situated at a nearly similar distance from the lens—in other words, when the conjugate foci are rendered nearly the same—then, in order to produce an image correctly, the elements of which the lenses are composed must be symmetrical, or, at any rate, as nearly symmetrical as possible. The rapid rectilinear of a certain well-known maker will, under such circumstances, produce a higher quality of image than any of his mere portrait lenses, excellent though they be, because from the symmetry of the former the anterior and posterior foci may be rendered similar. The production of photographic heads the same size as those of the originals is an entire mistake, optically speaking, when such is attempted to be effected by means of ordinary portrait lenses. For work of that description lenses must be constructed specially with a view to the object sought to be attained.

With respect to the best kind of lenses for the special work on hand opinions may vary; but we hope never to see repeated an incident which occurred at the last meeting of the London Photographic Society, when a third-place candidate for a certain prize offered by Mr. Crawshay thought it good taste to sneer at the tools employed by his successful rival, and not only so, but to act the part of a *claqueur* on behalf of another maker, whose productions are of so high a character as happily not to stand in need of such unwise adulation as that offered, and can afford to stand on their own intrinsic merits. How a gentleman who has for so many years been a member of the Council of the London Photographic Society could have so forgotten his position as to permit himself to drift into such an unenviable position as that in which he was placed is one of those matters which, while displaying a trait of human frailty, is a thing the managing body of the Society must suppress in future. The palpable attempt at puffing indulged in by Mr. H. P. Robinson has been a subject of serious comment among many of his fellow-members, as tending to be very detrimental to the best interests of the Society if a repetition of such a course be permitted; while it cannot fail to be a source of annoyance to the eminent optician who, on the occasion to which we refer, was so unfortunate as to be made the object of the indecorous eulogy on the part of the gentleman named. "Good wine needs no bush," and English opticians are quite able to hold their own against foreign rivals without requiring such ill-timed, though doubtless well-meant, advocacy as that to which we have thought it our duty, in the interests of the Society and of an optician of high reputation, to direct attention.

M. DAVANNE'S THEORY OF THE DRY COLLODION PROCESS.

In our *Foreign Notes and News*, at page 534, we published some observations by M. Davanne on the theory of the dry collodion process, as made by him in the course of a recent lecture on photography at the "Ecole des Ponts et Chaussées." Such remarks, coming from one of the highest authorities in France on photographic chemistry, have no ordinary interest, and we listen to them as we would have done to the words of Hardwich, had he suddenly reappeared amongst us after fourteen years quietly spent in experimenting. But it is not in the nature of the human mind, or, at any rate, of *some* human minds, to accept theories on *any* subject without due investigation, no matter how high the authority may be from whom they proceed. We will venture, therefore, in the present article to discuss M. Davanne's remarks on the *rationale* of the dry collodion processes—in fact, to "call him over the coals" to some extent for the opinions he has been advancing.

There can be no doubt that the subject of dry collodion is one of the highest importance to photographers, both professional and amateur. It is important to *us all*, whatever branch of photography we may chance to follow, because if this problem could be solved satisfactorily it would bring fresh converts to our ranks by hundreds and thousands, and would tend more than anything else to the general development of photography in all directions. It is to an improved *negative* process that we must now look for further advance in our art; for it seems as if nothing more could be done than has now been effected in positive printing. No one can look upon fine collotypes, autotypes, or Woodburytypes without feeling satisfied in his own mind that the problem of positive printing has been satisfactorily solved. Here we have every technical excellence combined with permanence, cheapness, rapidity of production, and no risk to the negative, or need of its exposure to light—at any rate, in two out of the three processes named—more than once; but in the taking of negatives we are still hampered by all the special troubles which attend the working of the common wet collodion process away from home, judging, at least, by the very small number, comparatively, of professional photographers who have adopted in earnest a dry method.

Nevertheless, the problem of dry collodion *has* been solved in a manner most complete for all subjects not requiring a very short exposure by the process of Mr. Russell Manners Gordon; and this fact should encourage us to persevere in our search for a method which combines, at least, the same advantages as his. For instance, on a recent tour by him in Brittany and Normandy, out of thirty dry plates prepared in London—one of which met with an accident during the exposure—twenty-nine negatives of faultless perfection were produced and exhibited. The plates were not developed until after his return to London—that is to say, until about six weeks after the date of their preparation, and, in the case of one, six months after exposure in the camera.

These facts are not new to our readers, and if we now recall them to their memory it is in the hope of fixing their attention upon what has actually been done by means of a dry collodion process. The emulsion processes have also made great strides during the present year since the abandonment of the wrong principle of mixing the ingredients which was at first followed; and by these improved methods it has now become possible to prepare a bromide of silver emulsion which is said to keep indefinitely—and why not?—and to require no washing nor preservative.

These progressive steps in the methods of preparing dry plates are of the greatest importance to us all. By simplifying the outdoor processes and doing away with all the *impedimenta* of wet collodion a fresh impetus will be given to our art, which will be felt in *every* application of it and by *all* who are in *any* way connected with it. But these progressive steps must not be steps in the dark. We must strive to understand what we are about, and to work on right principles. Let us, then, turn to what M. Davanne has got to tell us on this subject.

In the first place he says that the free nitrate must not be allowed to dry upon a plate—which is correct enough; but he adds that when it is all completely washed off the plate loses much of its sensitiveness. Is this strictly true? Are we to accept it as a proven fact? Yes, no doubt we are, when the plate contains nothing but iodide of silver. But iodide of silver has no longer a leading place in the preparation of dry plates; bromide of silver has taken the place of it in some cases entirely, and in other cases to a great extent, and what was true of a washed *iodised* film is not true of a washed *bromised* film—at least according to many high authorities. M. Davanne's first postulate cannot, therefore, be granted without reservation.

In the next place, he tells us that the chief office of a preservative is to keep open the pores of the film, and to render it, when dry, sufficiently permeable by the developer. Here, again, we must take exception to his remark, since it is quite at variance with the known fact that if a washed film be exposed *wet*, without any preservative, a good, bright negative cannot in general be obtained; whereas, if the same film be coated with a preservative, and be then exposed *wet*, a good, bright negative is the rule and not the exception. Now, here the merely mechanical office of the preservative in keeping open the pores of the film and rendering it permeable by the developer has no place, for the film *is* permeable, without any preservative, whilst *wet*. In the fact just cited the real action of the preservative seems to be *chemical*, and not mechanical, and the true theory of the dry processes imperatively requires that we should explain what this chemical action is; for in these processes either the pyroxyline itself must be powdery and strong in its reaction with the salts of silver, or an organic preservative of some kind must be applied in order to obtain a good result. Such, at least, is the common verdict of general experience in this matter. A wet or moist film does not require a preservative merely to keep its pores open, and yet a wet or moist film will not in general yield a good negative unless a preservative be applied to it. We trust, therefore, that M. Davanne will reconsider his remarks on this part of his subject.

Lastly: he tells us that certain deliquescent salts have been applied to washed films as a substitute for a preservative. No doubt they have, but, we believe, with no good result. In our own practice we have found that washed plates which have been coated with glycerine (an inert organic substance) or with a deliquescent inorganic substance generally fog.

In short, the true theory of the dry processes seems to us to involve an explanation of the wonderful part played by organic matter of certain kinds when applied to a washed bromide of silver film; and we cannot regard any theory as sound in which nothing more than a mechanical action of the preservative in keeping the pores open is assumed. Of course a powdery pyroxyline, which would darken in the light if saturated with nitrate of silver, or a gelatine vehicle for the silver bromide, may answer the purpose of a preservative or organifier to the required extent.

HOW TO MAKE THE MOST OF THE WINTER EVENINGS.

We occasionally see advertisements for operators and assistants in which remuneration at a certain rate per week during summer, and considerably less during winter, is offered, and are tempted to inquire whether photographers' assistants are so different from other men as to enter into a state of hibernation, and require less clothing and less food during the dark days. In the absence of any evidence that such is the case we are entitled to entertain the contrary assumption, and believe that there is a "screw loose" somewhere. The employer is supposed to make hay while the sun shines—to do sufficient work in the leafy month of June to compensate him for the difficulty with which even a very small amount of work can be got through in dull November; and we think that, in all fairness, the employed should have a similar interest in the financial results of the busy season. Not only do we think that "in all fairness" they are entitled to this, but we also believe that the employers who do not recognise that right adopt an unwise policy, and really lose more than they gain by the questionable economy.

Human nature is pretty much the same all the world over—at least, amongst the higher grades. It has a rather high opinion of honesty, and duly appreciates the doing unto others as you would have others do unto you; but human interest is also a mighty lever, and exercises a wonderful power in influencing the actions of men in every grade of life. To the influence of self-interest the photographer's assistant is not, so far as we know, an exception; and we have little doubt the knowledge that the winter's income might not be less than that of the summer would nerve his arm, and sharpen his faculties generally, to give, if possible, more than "a fair day's work for a fair day's wage" at a period of the year when that work could be done in return for the expected "fair day's wage" for much less than "a fair day's work" which must, of necessity, be the case for a considerable time, in our changeable climate, so long as photographers confine themselves to portrait and landscape work pure and simple.

Of course we are aware that, taking a superficial view of the question, it seems subversive of the teachings of political economy to insist on paying as much for five hours' labour at one season as is paid for nine hours of the same work at another; but, for reasons already given, we are satisfied that the recommendation is sound in principle. We would ask, however—Is there really any necessity for, or good reason why, photographers should not be as constantly employed during winter as in summer? We think not, and are certain that there are many ways in which the dark days and darker nights might be occupied both with pleasure and profit. We have no expectation that any arrangement of artificial light will ever be found which will equal sunlight for ordinary portrait work, although we possess several very fair specimens [produced by the aid of artificial light.

There is much room for earnest workers to experiment in this direction, and there are some who believe success will lie in utilising some of the American liquid hydrocarbons; if so, we are certain no one will grudge the fortunate discoverer of a practical method all the honour and profit the patent laws can secure him. Until, however, the desired discovery be made there are many other ways in which the photographer may profitably employ his leisure hours.

An American contemporary places on record his conviction that any enterprising photographer can turn his winter evenings to more profitable account by the aid of a magic lantern than he can whole days in his regular course of business. In the same publication Mr. A. Hesler, in describing how he manages to fill up his evenings profitably, says that he lays himself out to do it thus:—"Having the lantern, * * * I give parlour exhibitions at the houses of those who wish to entertain their friends." For this purpose he provides pictures of a local and attractive character, and realises from ten to twenty dollars per night.

But unless our photographers possess the ability of imparting to such entertainments an educational aspect they would degenerate into mere shows and the operators into mere showmen—a state of things by which the profession would be degraded and the position of the photographer certainly not improved.

Although, however, we cannot recommend all to follow out this plan of lantern exhibition, we can heartily advise all to aid in producing the *matériel* from which they can b) prodnced. There are few who have not negatives from which, by one or other of the methods recommended in our recent issues, excellent transparencies may be printed; and, as the demand for lantern work is year by year on the increase, we feel assured that good pictures would meet with ready sale to those who deal in that class of work.

We would here add a word of advice in regard to toning the transparencies. Avoid both the unpleasant silvery-grey and the cold purple-black tones so frequently seen and so little admired, and strive to obtain the warm purple-brown so satisfactory on the screen, and which, from recent experiments, we find easily produced by a mixture of the chlorides of gold and iridium. As they keep perfectly when mixed a large quantity of the solution of gold may be made, and the iridium added in small quantities at a time till the proper proportions have been obtained.

In the "magic photographs," so popular at one time, we think there is an opening for a successful line of business, especially during the Christmas season. The popularity of the "magic photographs" came to an end simply, we think, because the pictures chosen were not of a character to interest the parties for whose amusement they were introduced. We believe that if they were made up in packets of half-a-dozen each, and labelled "magic fortune-tellers," the interest would be revived and perhaps intensified. They should be labelled respectively "male" and "female," and used somewhat in the following way:—If it be a lady whose future partner for life it is desired should appear, a suitable print—invisible, of course—is selected and laid in the dish on moistened hypo.-charged paper. She is then told to look steadily on the paper for a few seconds, when, as a matter of course, the image will be developed, which may either be that of a suitable young gentleman, or one much older and surrounded by a large family of young children. We merely here throw out a hint; our friends may vary it as they please.

We may remind those of our readers who have forgotten the facts that the invisible pictures are very simply produced. The print is fixed just as it leaves the printing-frame, without toning, and then immersed in a solution of bichloride of mercury, till the image disappears. Along with each picture is placed a piece of blotting-paper that has been dipped in a solution of hyposulphite of soda and dried, and all that is required to make the image visible is to moisten the blotting-paper with water and lay the print on it.

There is in the production of enamels another source of evening occupation which has been comparatively uncultivated. There is no doubt that in our own country this exceedingly beautiful process has been brought to a very great degree of perfection; but it has hitherto remained in very few hands, and has not been worked with the *empressement* it deserves. Enterprise and exertion are necessary to secure popularity; and we are quite certain that if the process of enamelling were properly taken up the demand would be sufficient to keep a large number of furnaces at work during the winter evenings. The process is generally believed to be beset with difficulties, and many have, in consequence, been deterred from giving it a trial; but such difficulties exist mainly in the imagination, for a high-class enamel is not the difficult thing to produce that it is imagined to be.

LANTERNIANA.

A QUESTION is raised by our respected friend and editorial predecessor, the Rev. F. Hardwich (a name still remembered with sincere pleasure by old photographers and readers of the literature of photography,) which is one that is very large indeed, for involved in it is the still wider question—What is the best artificial light for use in the lantern?

The *best* light, without doubt, is the oxyhydrogen, but that, unfortunately, is one that it is not expedient for exhibitors situated as Mr. Hardwich is to use; for it involves no small amount of trouble, preliminary preparation, and skill, especially on the part of the assistant to whom is delegated the task of attending to the lantern, that cannot at all times be commanded. With an oil lamp, on the contrary, there is no trouble whatever; but there is the drawback that the light emitted by even the best argand oil lamps is scarcely sufficient for lantern exhibitions, except those conducted on a small scale.

After numerous trials of the various argand lamps at present procurable we have arrived at the conclusion that with a wick of a given size a better light, and one more easily managed, can be secured when using petroleum than the best fixed oil. Solid paraffine certainly affords a pure and brilliant light; but we have only been able to use it successfully when we adopted special precautions for retaining it in a state of liquefaction. Among the numerous forms of burner tried for petroleum none has given us so much satisfaction as that in Woodbury's sciopticon. This burner consists of two flames emanating from straight wicks placed close together, and arranged so as to present the edges of the flame to the condenser.

Whether a lamp constructed upon the same principles as that of the sciopticon lamp could be adapted to the numerous ordinary English lanterns at present in use is a matter on which we have not yet bestowed any thought; but which, undoubtedly, deserves attentive consideration. Meanwhile we commend Mr. Hardwich's communication to the attention of our readers, for in it he states with much clearness the difficulties one has to encounter, thus rendering his remarks in the highest degree suggestive. He says:—

I KNOW that you are an authority in all matters relating to magic lanterns, and I therefore take the liberty of consulting you as to the best mode of securing an uniformly good light at the smallest expenditure of time and trouble. There are, I believe, more than 20,000 clergymen in England, and many of them, probably, are not aware of the good which might be done by showing scriptural and other slides of a religious character upon the illuminated screen. My own experience is that a lecture of this kind never fails to draw an audience and to give general satisfaction to all who witness it.

In my own case I commenced by buying a shilling manual of instruction, and setting to work as best I could; but I soon satisfied myself that the directions were not sufficiently minute and particular. Camphor dissolved in sperm oil was recommended for the lamp, but a sample which I purchased at a druggist's, ready-made, did not work well; it appeared to contain water, and burnt with a flickering flame. After this I tried colza oil, such as is commonly used for moderator lamps, and obtained a much better result; the flame was steadier, and could be raised higher without smoking. Next I dissolved camphor in the colza oil, one ounce to the pint, but could not satisfy myself that the circle of light was improved; the old tendency to smoking returned, but no other difference was observable. On this point, however, I should like to ask your opinion—whether the use of camphor in the oil is of any real advantage; because if the simple colza oil admits of the wick being raised higher without smoking the gain in that respect must compensate to some extent for the loss in the other. Also, is it proved that sperm oil, which is more difficult to get pure, has any decided superiority over colza oil, which most families keep always in the house?

A friend in whom I have confidence recommended me to try the solid paraffine as a source of light, and, acting under his directions, I melted down a pound of the best paraffine candles, and poured the liquid into the lamp. It served me, however, an awkward trick on one occasion, for in the middle of my lecture the lamp suddenly went out and could not be relighted. Let me tell you how this unfortunate accident happened:—In my first experiment I melted the paraffine in an earthenware teapot standing by the fire, and poured the clear, limpid liquid into the lamp previously warmed. All then went well; but on the next occasion I filled the lamp beforehand, and allowed it to solidify, intending to melt it down again by placing it before a hot fire. When I reached the schoolroom where my lecture was to be delivered I stood the lamp at the fire, and kept it there for three-quarters of an hour, until the sides were so hot that I could not comfortably touch them with my finger; yet, in spite of this, as I said before, the lamp went out suddenly, and on pulling out the oil chamber I found a small lump of solid paraffine blocking up the entrance.

My feeling at the present time is that the solid paraffine process, although it requires care, is one which will find favour. The light burns clear and steady to the last drop without clogging the wick, and there is no tendency to smoking. The expense is greater than that of colza oil, but the same weight of material will go farther. This may easily be shown by taking a Price's composite candle (say one of No. 2, six to the pound) and comparing it with the best paraffine (six to the pound); you will find that the paraffine candle, giving the same amount of light, will burn two hours longer than the other. The trimming of the wick is also much simplified by using the paraffine; when the lamp has become cold it can be pared down with a penknife level with the brass, and cuts smooth like horn. With the oil I find it difficult to cut the wick perfectly even.

The general result of my trials so far is that the paraffine gives a longer, brighter, and steadier flame than either of the liquid oils, and that if the wick be turned up to the full height there is no fear of solidification; the heat generated by the lamp will keep it melted, if the lantern doors be shut.

F. HARDWICH.

WE perceive, from the reports of the great National Poultry Show, now being held at the Crystal Palace, that our valued contributor, Colonel Stuart Wortley, is one of the judges of poultry; and we remember, when enjoying that gentleman's hospitality, to have seen the numerous silver cups and other trophies won by him in former years as an exhibitor of prize fowls. "What has that to do with photography?" it may be asked. We shall speedily see. It is the custom for those who are most eminent in the poultry world to be elected to fill the office of judge at the national show above alluded to, and we imagine that if such a sensible system prevailed in photographic circles we should have been spared the humiliating absurdity of only four competitors (one of them, moreover, being the donor of the prizes) entering for the prizes of £50 and £25 so generously offered by Mr. Crawshay for large heads, and an equally small number for his other prizes. The judges should, in our opinion, consist of those whose known talents and knowledge of the matters to be adjudicated on would impart confidence to intending competitors, and under such conditions alone can successful prize competitions be carried out.

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

VI.—APPARATUS FOR PRODUCING AND APPLYING HEAT.

THE use of gas is fortunately now so common that there will be comparatively few laboratories without it, and the ingenuity which has been bestowed on the construction of various forms of gas furnaces and burners enables one to dispense almost entirely with every other fuel. There will, however, be cases where it is not available, and other less convenient means have to be adopted for producing the heat so frequently required in chemical operations. For boiling in large vessels, distilling, &c., a common open fireplace is most useful, and is, indeed, desirable, whether gas be laid on or not. If the back of the fireplace be built of fire-bricks, and a blower or screen suspended by its top corners, capable of removal at will, be provided, covering the whole of the open front with the exception of the bars, a very efficient furnace will be produced, sufficient for most crucible operations, and capable of melting gold and silver with ease. The object of the fire-bricks is to keep the grate, &c., in place, the contraction of the entrance for air producing such a draught that a few hours' use of it would burn common bricks almost to powder, and the whole fireplace would soon tumble to pieces. The blower, a short distance above the bars, should be provided with an aperture about five or six inches square, covered with a movable shutter for convenience in introducing fresh fuel and taking out and putting in the crucible; it also serves to moderate the draught when required, which latter effect can also be produced by moving the whole blower a little out of place. The best fuel for the purpose is good coke, or, as that is generally to be obtained only where gas is produced, well-screened cinders will answer almost as well.

For operations on the table other means will, of course, be necessary. They will be found in the various charcoal furnaces and spirit lamps of many different forms. The former are made in iron and fireclay—a simple iron chauffer being a very useful article for boiling and evaporating. Although the more complete and costly forms do not come within the scope of these articles, I may allude to a very convenient furnace known as Luhme's, which is useful for a great variety of purposes, charcoal only being used as fuel. It can be obtained at a reasonable cost. For the student with limited means a simple and useful furnace in the form of a cylinder, with a grid and air-hole in the lower part, could be made of sheet iron by any worker in tin or sheet metal at a very moderate outlay.

Fireclay furnaces can be obtained of a simple form—little more than a mere basin to hold fuel—at a slight cost, and of all shapes between it and the more elaborate ones capable of being used for most operations of chemistry.

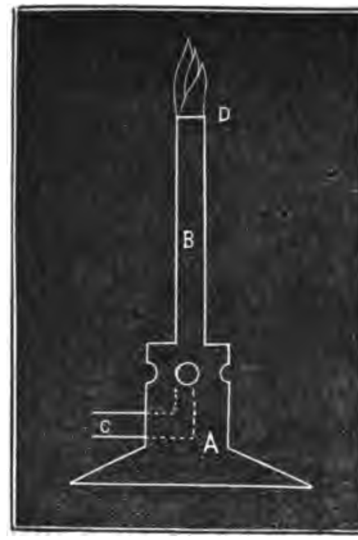
The simple spirit lamp is the most common and best-known piece of apparatus for producing heat on a small scale to be found in any laboratory—always handy, capable of being lighted at a moment's notice, and giving a clear, hot, smokeless flame. No laboratory is complete without it. It is made in glass, stoneware, and metal. The former is to be preferred, as the state of its contents can be easily seen. Metal ones are apt to get heated, and if extinguished while hot and quickly relighted an explosion is apt to result. I witnessed such an occurrence last year, when the student's hair was burnt off one side of his head, but, fortunately, with no further ill result. On the same account stoneware or porcelain wick-holders are much to be preferred to metal. A few inches of cotton wick will last a long while, as it does not get consumed. Methylated spirit (not "finish") is the cheapest spirit to burn, pure alcohol costing about five times as much. Methylated "*finish*," which is more generally kept, contains a small proportion of gum, clogs up the lamp, and burns with a slightly smoky flame; still, as there is often difficulty in obtaining the methylated spirit, the "finish" need not be rejected if the former cannot be obtained. *Wood* naphtha is much to be preferred to "finish," and is likely to be procured with little difficulty in most chemists' shops.

Before lighting the lamp the wick should be neatly trimmed, leaving it projecting from the burner only a little distance if a small flame be required; while for a large flame it may be drawn out for half-an-inch or more, and the strands separated. When the lamp is to be extinguished it should always be done by blowing it out and allowing a few seconds to elapse before putting on the cap, and not by placing the cap upon the flame, as the latter plan is liable to cause the cap and lamp to adhere so firmly when cooled down as to render them most difficult of separation. When not in use the cap should always be kept on, to prevent waste by evaporation. Argand spirit lamps are made with a slight modification of the ordinary argand oil burner and reservoir. They give a larger volume of more intense heat than the former, and are useful for crucible fusions.

There is a very useful form of blast spirit lamp for small tube bending and other purposes where a small volume of intense heat is required in a circumscribed place. It consists of a lamp over which is suspended a copper globe, into the top of which is soldered a narrow brass tube, terminating in a blowpipe nozzle, and bent round the globe till the nozzle reaches just above, and in front of, the wick of the lamp. The globe being partly filled with spirit, and the lamp lighted, the spirit very soon begins to boil, and its vapour is projected with great force through the flame, forming a small jet of intense heat.

On a similar principle is constructed the "Russian blowpipe," which consists essentially of a metallic cup with hollow sides enclosing an air-tight chamber. Forming an exit from this chamber a tube projects from the inner wall and reaches to the centre of the cup, where, terminating with a very fine orifice, it is bent to point perpendicularly upwards. The tube in the opposite direction is continued inside the chamber almost to its top. An aperture in the upper portion of the outer wall of the cup is provided with a short length of metal tube, forming a neck. To use the instrument the chamber is filled with spirit through this neck, which must then be tightly corked, but on no account be covered with a screwed cap, as is sometimes done; a small quantity of spirit is also put in the bottom of the cup and inflamed. The flame playing against the sides of the chamber soon raises its contents to boiling point, and the vapourised spirit is ejected with great force in a fine stream through the tube nozzle (which is itself enveloped in flame), and immediately sets on fire with a hissing roar, a jet of flame of intense heat being produced—very useful in cases where a high temperature is required for a short time only. It is a very serviceable adjunct to the lecture table, and will heat a crucible almost to whiteness in a few seconds. When this blowpipe is in use care should be taken that the neck with plug *points away from* the operator or any person in its neighbourhood; for the pressure of the vapour is so great that if the nozzle should be too narrow, or by any chance stopped up, the contents would be expelled with violence—from which will easily be seen the reason of the caution against a screw cap, as in the event of a stoppage a dangerous explosion would result. The apparatus is also provided with a cover, which serves as an extinguisher, and has usually attached to it a small wire ring for supporting crucibles in its flame.

Passing on now to apparatus for use with gas, the well-known Bunsen's burner at once claims attention, as being the most useful in the whole range of laboratory apparatus. It is simply a burner provided with an arrangement for mixing air with the gas before burning, and is constructed as follows:—On a broad base is screwed a wide tube A perforated with four holes, and into this the narrower tube B. The gas pipe C terminates in a burner with several small orifices. The burner is essentially incomplete without a cylinder, which I will term the regulator, the same height as the tube A, fitting loosely over it, and having four small holes exactly corresponding with those bored in the tube. To use the burner the



tube C is connected by an india-rubber tube attached to an arm from the service pipe, which should be provided with a stopcock. First placing the regulator so as entirely to cover the holes in the wide tube A, the gas is turned on and lighted at the top D of the burner, where it should continue to burn, though it will probably give a little "pop" and blow down and burn *inside* the tube; upon turning the gas off, and then on again, waiting a second or two, it will, on re-lighting, burn in its proper place at the top with a white smoky flame. The regulator being now turned slowly round so that the holes in the mixing chamber A become partially uncovered, a great change will take place in the character of the flame; it ceases to be smoky, and as the regulator is turned, admitting still more of the atmospheric air, its luminosity gradually diminishes till at last, when the admission of air is properly regulated, it burns with a faint blue light, quite free from white, perfectly pure, and so smokeless that a white porcelain slab placed within it for half-an-hour would not receive a stain.

The flame is then perfect, but as upon regulating the due proportion of atmospheric air to the coal gas depends its excellence, suitable precautions will be necessary whenever it is required to be lowered, or the supply of gas from the main should be limited. In lowering the flame, if the regulator be not altered, it will, after a certain point is passed, "blow down" the tube and light at the jet in the mixing chamber, giving out a thick smoke. The remedy is then to turn or blow out the flame and lessen the supply of air by partially covering the air-holes with the regulator; it will then, when re-lighted, burn properly. But the better plan is, before turning down the gas, to make a point of decreasing the supply of atmospheric air by turning the regulator. It may always be borne in mind that when air is too freely supplied the gas will blow down, and when not present in sufficient quantity the flame will have a white tip, and so give a smoky light. There is an exception to this latter rule; it is when the orifices of the jet for the gas are too large. The flame then will always have some white in it, though the gas be turned down as low as possible.

The "Bunsens" are made of various sizes, and fitted with sundry useful appliances; but the student must be cautioned on no account to use one without the regulator mentioned, as the burner loses most of its value if it be absent. Should he, however, find himself possessed of a burner without this addition he can readily improvise one by bending a strip of cardboard to the required shape and piercing it with suitable holes, keeping it in its shape by a touch of sealing-wax. One of the most common and most useful additions is a rose burner—a thick metal disc bored with a number of holes in its periphery, all opening into a large central hole connected with the top of the "Bunsen." The gas then burns at each orifice, forming a ring of small jets useful for spreading the heat over a large surface. The rose burner is made of two shapes. In one the central hole is cut clean through, and is covered at the top with a thin cover permanently attached, and turning on a pin, whereby the hole can be uncovered at will, and the flame, whether tall or spread, instantly reversed; in the other form the rose is only partially bored, and requires to be wholly removed when the straight flame is required, and *vice versâ*. It also has the disadvantage of being loose, and is liable to get lost.

Other additions are a star support, fixed a little below the flame, for holding a specially-made tray for catching the ashes from ignited filters; also, a small iron tripod to rest on the top of the burner, for holding small and light pieces of apparatus within the flame. The larger "Bunsens" can be fitted with fireclay casings and fittings to form small extemporaneous furnaces for evaporations, fusions, &c., as when covered with a cylinder with a long chimney the draught is much increased, and a very intense heat produced.

A very common form of apparatus for burning the mixed air—one which can be bought at almost any ironmonger's—is a cast-iron cylinder about four or five inches in diameter, fitted at the top with a piece of fine wire gauze, the gas entering from a jet or jets below, and the atmospheric air through the space formed by the feet between the furnace and its support. A very simple yet exceedingly useful modification of this furnace or burner is Fletcher's low temperature burner. In it the gas escapes through a series of minute perforations in a ring of copper tubing, and can be lighted either *above* or *below* the gauze. In the former case the hot, smokeless flame of the mixed gases is produced, and in the latter the less intense heat of the ordinary luminous flame; and the heat is so much under control that it is possible to heat and boil water in a common glass tumbler without breaking it. For more intense heat this most useful burner is supplied with an extra tube for using a blast from a pair of bellows, a new and economical form of which, for using with the foot, has been specially devised for this burner, which, after the "Bunsen," is one of the most useful additions to the laboratory that has appeared of late years. G. WATMOUGH WEBSTER, F.C.S.

OUR EXPERIENCE IN TAKING DIRECT LIFE-SIZED HEADS.

[A communication to the London Photographic Society.]

I HAVE great pleasure in responding to the invitation of the Council by giving a description of the method by which our large direct heads were taken, which have been awarded the first prize in the Crawshay competition. I fear, however, the description will be disappointing, as I have no secrets to impart, nor anything "new" (that I am aware of) to bring before you, beyond that which is already known; still, if from our experience any thing useful be suggested, we shall be more than pleased in having made the communication.

Studio.—I will commence with the studio, which is about thirty feet long by fourteen feet wide, and seven feet nine inches from the floor to the eaves.

The roof is of the ordinary ridge or grotesque shape, save that the apex is not centrally placed, the glass side covering a larger area than the opposite or opaque side by three feet through the entire length of the roof.

The whole of one part of the roof and side is glazed to within six feet of each end. Both ends are opaque, with the exception of a narrow light, which is admitted in the roof and side, about midway between the sitter and the background.

We attach some importance to this intermediate light, as we believe it gives a relief to portraits which no other plan we are acquainted with will produce. It is not more than six inches wide, and is easily regulated by shutters, and made to fall upon any part of the background at will, and shut off altogether if desired.

Lighting the Sitter.—We find that greater contrast is necessary in lighting large heads than those of the cabinet or *carte* size.

The situation of the studio allows a north-east light to fall obliquely on the sitter; and the stronger the light the more experience is required in arranging it. A large, movable, folding screen covered with dark material will be found handy in securing the proper amount of contrast; but no reflectors whatever of any kind were used.

Lens.—The lens is a six and a-half inch portrait-combination, by Jamin, of about twenty inches back focus, a three-inch central stop being used.

The Plates.—The plates receive a preliminary coating of sheet gelatine (instead of albumen), as recommended by Mr. Tunny.

Coating Plate.—To coat the plate it is balanced on the cork of a bottle or jar, and tilted gently at the corners to allow the collodion to flow evenly over the surface. Plates of almost any size can be easily coated in this manner.

Collodion.—Five of the portraits were taken with collodion made by ourselves, the portrait of a lady, No. 339, being taken with Mr. Edwards's collodion, of Hackney. The formula of our collodion is as follows, viz.:—

Alcohol, pure, 825	40 fluid ounces.
Ether, methylated, 720	40 „
Soluble paper	300 grains.
Cotton giving a powdery film	350 „

This is mixed and well shaken many times during the day, and then allowed to settle five or six days, or longer if not sufficiently clear.

Iodiser:—

Iodide of ammonium	700 grains.
Bromide of ammonium	500 „
Bromide of calcium	400 „
Alcohol, 820	20 fluid ounces.

It is iodised by adding one part of the iodiser to four parts of the plain collodion. The plates were sensitised in a neutral forty-grain bath in a flat dish.

Exposure.—The exposure given to head No. 337 was seventy seconds; the picture was taken at eleven o'clock in the forenoon. No. 338 was taken at half-past three in the afternoon, and exposed 100 seconds. No. 339 was taken about twelve o'clock in a dull light, with an exposure of two minutes.

Developer.—The developer is that which Mr. Edwards gives with his collodion.

The negatives were not redeveloped with pyro. and silver; but, should a plate appear too thin for printing, it is placed in a strong light (say for half-an-hour), when it will generally be found to have acquired sufficient printing density. It is then fixed in a weak solution of cyanide.

Printing.—The negatives were printed on doubly-albumenised paper, manufactured by Mr. Hart, of Kingsland-green. It was floated three minutes on a sixty-grain silver solution, and toned in a phosphate of soda and gold bath. JOHN CHAFFIN.

ON THE PRODUCTION OF TRANSPARENCIES BY THE "DUSTING-ON" PROCESS.

ALTHOUGH we gave in the number of this Journal published on August 11, 1871, a *résumé* of the above process as it appeared in the *Photographisches Archiv*, No. 229, July, 1871, we gladly comply with the request of Dr. Liesegang, expressed in a note of reclamation, to be found in the portion of the Journal devoted to correspondence in the current number, and reproduce the article in English dress, as furnished by Dr. Liesegang himself.

THE shortest and surest way for producing reversed negatives (for lichtdruck or carbon printing) is without doubt the reproduction by the "dusting on" process with bichromate. A glass plate is coated with a solution, which we may call "chromatine," dried, exposed under a negative, dusted on with a black powder, collodionised, and washed. The sharpest copies are only obtained in using plate glass, the ordinary glass being seldom sufficiently plane. The plates are well cleaned.

The sensitive preparation is composed of—

Water	2 ounces.
Glucose	50 grains.
Gum arabic	50 „
Honey	10 „
White sugar	20 „

Dissolve and filter, and add 100 grains of a saturated solution of bichromate of ammonia. Keep the solution in a dark room. The best way is to keep the two solutions separate, and to mix them before use only. The mixture decomposes in time, and should be used before it has become of a brown colour.

Before using the mixture free it of all air-bubbles; then coat a plate with it, as you would do with collodion. Put the plate on clean filtering-paper, and dry it over a spirit lamp. Do not use too much heat, but only what is necessary to get off all humidity. Expose under the negative to be reproduced from one minute, in full sunshine, to a quarter of an hour or more, in diffused light. Then lay the plate on a sheet of dry, clean, white paper, take a broad dusting-brush and some powder colour.

The best powder colour for developing negatives is obtained by powdering French "*cônté*" chalk No. 2, which is used for crayon drawings.

Paper, brush, and powder must be perfectly dry. Every trace of humidity becomes visible in the reproduction. With the brush you dust some of the powder on the plate; if no print become visible take the powder carefully away and lay the plate aside for a few minutes, then dust on again. If the film refuse to take the powder colour that shows you have exposed too long. This will often occur to a beginner. The exposure having been right, by the first application of the colour a weak but clean print will be developed. Take then all the colour away, and after two or three minutes dust more powder on, and continue to do this until the negative be sufficiently dense.

If the print develope too quick, and if it be foggy, you gave too short an exposure. In cold and wet weather see that the negative as well as the printing-frame are quite dry.

It is necessary to know how far you must develope a negative. The chalk powder needs only a very thin application. In looking through the glass the deposit must only appear of a brownish-grey colour. It will then print like a good negative. If you develope as far as to have the apparent density of a collodion negative it will be difficult to get a print at all, the colour of the powder being very non-actinic. Those who have used the tannin process will have remarked that it is not the density of the deposit but its colour that makes a good printing negative.

Trials with a great many colour powders have shown me that for reproducing negatives the chalk powder is the best.

The reproduction of lantern slides and stereoscopic transparencies is done in exactly the same way; but for these I prefer other colours—for example, the black chalk used by painters. Finely-powdered vermilion (*cinabre*) developes fine red prints, but which do not show this colour in the lantern, and could not be distinguished from ordinary lantern slides. With the "Schweinfurth green" powder it was impossible to obtain a print, as it would not stick to the plate.

Beginners will do well to commence practising with one of the small photographic lantern slides before they undertake the reproduction of negatives; and, if they come to these, to try now and then a print on albumen paper, so that they may learn to judge of the colour and density necessary.

The powder prints still require fixing. Coat them with plain collodion and wash in water till they have lost their yellow colour. You may retouch and varnish them like an ordinary negative. During the year 1870 a large quantity of these reproduced negatives were prepared by myself, and, after the above formula, by many gentlemen to whom I have shown the process.

P. E. Liesegang, Ph.D.

ON THE ESTABLISHMENT OF A BRITISH PHOTOGRAPHIC CONGRESS.

[A communication to the South London Photographic Society.]

Wherever civilised men are gathered they seem to feel it a duty, as they certainly find it a pleasure, to form societies for the cultivation of whatever art or science they have an inclination for. Not content with merely instructing each other they, through their journals, acquaint the world with what they are doing and what they have accomplished. Thus knowledge is cultivated, established, and diffused.

A still further development of this mutual form of cultivation has taken place in our times by the establishment of annual gatherings of all those who have some common object of study. These annual meetings in no way dispense with the need of local societies; they are supplementary to them. They not only supply the opportunity of the leading men of the various local societies meeting together, but they permit those also to assemble who are removed from the local centres, and who otherwise are without means of personally meeting with their fellow-workers. These yearly meetings become, in fact, annual parliaments for the promotion of some definite purpose. One of the advantages—and, perhaps, one of the greatest advantages thus realised—is the opportunity afforded to men of meeting together and strengthening their cause, by adding to it the closer bond of personal friendship. As the custom is now so generally established of having a period of relaxation during the autumn, that period is properly utilised to hold these meetings; thus the holiday is made capable of intenser enjoyment.

A "congress"—the name often given to these yearly gatherings—may be defined to be a large society composed of members living so remote from each other that they can assemble but once in the year. As a matter of convenience, as well as to give variety, the place of these meetings is usually changed each year; the additional duties and pleasures of hosts and guests are thus annually varied. The British Association for the Advancement of Science is the most marked example of these comprehensive peripatetic meetings. This Association, by its division into special sections, was apparently intended to embrace all the sciences and some of the arts. Fresh organisations, on a similar basis, have, however, been formed for the cultivation of social, medical, archæological, and other sciences, as well as for other purposes; and the best proof that there is a need for such societies is that the number of them is increasing.

Seeing, then, that persons following other pursuits find the advantage of such annual meetings, I raise the question—Are they not equally applicable to photography and to photographers? To consider whether there is room for such an organisation is the purpose of this paper, and in addressing you I address also the great body of photographers, amateur and professional, scattered throughout the country.

No argument is needed to show the desirability of photographers meeting together to discuss any and all questions appertaining to the art. At present no means exist by which photographers in their collective capacity can meet and take counsel together. The best that can now be done is meeting together in the local societies and communicating with each other through the photographic journals. But these limited means seem inadequate to represent the collective photography of the country. The few existing societies are widely apart, whereas photographers are in every town and in several large villages, to say nothing of the many skilled amateurs who reside in remote and out-of-the-way places. At least once a year an opportunity should be afforded for all who are interested in the art, wherever they may reside, to assemble together, and there to discuss in a broad and comprehensive spirit any topics of especial moment.

We are bound to recognise the fact that, year by year, photography is rapidly becoming a matter of great importance. It is no longer a scientific curiosity, an agreeable pastime, a fascinating hobby. To some it will always remain of this character—and long may they enjoy their interesting pleasure!—but to the bulk who practice the art it is a serious affair. With them it is their only way of earning a livelihood, of rearing their families, and of providing for declining years. The future development of photography will be materially modified by its changed aspect. When it was in the hands of the scientific man and the amateur all fresh knowledge was freely given forth without money and without price; but now that vast stakes are invested in its commercial applications every improvement has a definite financial value, and is capable of being turned into money.

This is a delicate subject to touch on, but I think it explains why professional photographers are and will be more chary in unbosoming themselves than amateurs. I think, also, that here will be found the explanation why photographic societies cannot exist in small towns. It is not so much in the smaller number who practice the art as it is in the trade rivalry and jealousy that prevents them associating and exchanging ideas. A clever man will not willingly educate his less skilful neighbour when the latter may use the knowledge against him by underselling or taking away custom; but the same man will willingly impart knowledge to another who lives a hundred miles apart. Anything, therefore, that can be done to relieve professional photographers from this pressure will produce benefit. I think that many will more willingly impart their knowledge to a great gathering than to a local society. There is something specially sympathetic in the meeting of those who come from distant places to see each other; the renewed personal contact, the flash of the eye, the tone of the voice, the grasp of the hand, stimulates men to thoughts that never otherwise would have found utterance. Therefore it is good for men to assemble together.

As such meetings always partake of the holiday character people must assemble more or less in a jubilant condition, and meeting with others having the same objects in life, they cannot but benefit by the welcome they give each other. Meeting under such conditions, relieved from the worry of sitters and the smell of chemicals, men must benefit when they see those they read and hear about, and whose works they admire, even though no well of information burst forth or no fresh fountain be discovered. If increased strength be gained by attending ordinary photographic meetings, when the body is weary and the mind full of care, how much more renewed vitality may not be acquired by new scenes, fresh faces, and the renewal of warm friendships! I dwell more particularly on these social advantages, for if nothing else be gained these are certain to be forthcoming. I am assured by those who attend similar meetings that these enjoyments are by no means to be despised.

But, granting for argument's sake that a photographic annual congress is desirable and practicable, is there any need to have a special organisation for the purpose? Cannot some existing means be utilised to provide photographers an annual gathering? As papers on photography are occasionally read at one of the sections of the British Association, could not that be adopted as a centre of union? I have thought of this, and before photography was so well established perhaps it might have been done; but it could not be accomplished now. Somehow photography, although the child of science, has never obtained a good foothold at the British Association, and, especially since the death of the lamented M. Claudet, each year it seems to have less. Scientific men, as a rule, do not understand photography. Its broad and general principles, of course, they grasp; but the minute details of its reduction to practice and application to commerce they properly ignore. But it is exactly these details and applications which are most interesting and valuable to photographers. Photography seems to have a little world of its own; and from what I know of the working of the sections I do not think any satisfactory nucleus could there be found. I think I should be supported in this view by the experience of those few photographers who are in the habit of attending the meetings.

That there is desire and a willingness for photographers to assemble annually, and even to travel a considerable distance to do so, is evidenced by the numbers who come from different parts of the kingdom to be present at the opening *soirées* of the parent London Society, and who attend at the technical meetings of this Society. It has been mooted more than once that the sphere of action of the parent Society of London might be enlarged so that, by an arrangement of annual peripatetic meetings, some such scheme as I am alluding to might be accomplished. I have my doubts of this. Although that Society has changed its name, I think it can never be other than a London Society; besides, it has sufficient scope in attending to its own business and duties.

I do not think that any local society can be so extended as to absorb the photographers who are scattered throughout the country. I think such an organisation as I am alluding to, while it might be composed of the men belonging to any of the societies, or to none of them, yet should be in harmony with all. It should trench on none of the local centres, but might be the means of causing additions of members and of information to all. It would probably hold its meetings at times and under conditions different to them, and its chief purpose should be the bringing within the fold a large number who now, from isolation and other causes, are debarred from personal photographic union.

It forms no part of my present purpose to suggest the exact business of this congress, nor how long it should be held—whether papers should be read, apparatus or appliances shown, processes worked, a technical demonstration made, or an exhibition held; but I certainly think its purpose would not be gained if a field-day or excursion were omitted, and, where the circumstances were favourable, I think a *soirée* should be held, where the ladies could participate in the enjoyment. If the idea be worth carrying out, all these details are the work of the managing committee. As to the good which would result from these annual reunions I am not willing to prognosticate.

I am not so sanguine as to suppose that we should be immediately able to make our negatives much better or our prints more permanent—that we should be able to obtain better prices for our work, or raise the status of our profession; but I see no reason why any or all these objects might not be aided, and other advantages be obtained.

Our American brethren have set us the example in forming such an organisation. In addition to their local photographic societies they have established a National Photographic Convention, and from the enthusiasm that prevails at their meetings the idea is eminently successful with them. We labour under fewer difficulties than they do; for, from their immense continent, many have to travel enormous distances to attend—even thousands of miles—and yet they seem so gratified with their results that, in separating, it is only with a determination to make their next meeting more agreeable and useful.

As I have already intimated, I bring the general subject for you and others to discuss. I feel that our present societies do not embrace all the photographic talent that exists. I think there are many good and true men that are lost to us, and which our present machinery cannot include. I feel also that something should be done to create a feeling of pride among ourselves that we follow an honourable profession and practice a beautiful art. I think that we have so many good and worthy men attached to the craft that it is a pity they do not know each other better; and I humbly suggest some such scheme as this as an additional means of bringing them together, so that they may know and esteem each other. We hear and read of the pleasant time some of the societies enjoy when they have a field-day out, and I ask why cannot there be a general field-day? Why cannot we have on a larger scale a holiday in the woods? Suppose we suspend a meeting or two in the winter and hold them in summer—in daylight instead of night; not in a dingy, yellow-lighted dark room, but under the canopy of heaven. All this, and more, may be accomplished at a British Photographic Congress.

I have purposely abstained from suggesting how such a scheme should be started. I submit the broad idea only for general consideration; but I must remark that to be successful it should be so comprehensive as to embrace all, and not be the emanation of any special section. It must not be appropriated by any one society nor be the rival of any. Whether independent men from all parts of the country should mature the plan, or delegates from the metropolitan and provincial societies, together with those who belong to no society, should unitedly bring it about, I leave to future consideration. I am inclined to this latter method, as there are obvious advantages in meeting in the great centres where societies already exist.

Trusting that I have said enough to interest you, I leave the subject, hoping that you and others may so discuss it that profit and pleasure may be the result. JABEZ HUGHES.

BOLD PRINTS FROM FLAT NEGATIVES.

MR. CHARLES W. HEARN (author of *The Practical Printer*) gives, in our Philadelphia contemporary, the following as a most excellent way to obtain fine and, indeed, excellent prints, from flat and withal poor negatives:—

Obtain from any bookstore some common tracing-paper, and place a suitable piece on the *back* of the negative to be *doctored*, sticking the four corners to the plate, so as to keep it in position. Now obtain a No. 2 Faber lead-pencil, and lightly place on the paper a few touches of the pencil, softening down with the ball of the finger. The greatest care is necessary in placing this lead on, to do the thing in a nice manner. If too much be placed on the paper erase with a common pencil-rubber. By reversing the plate, thus placing the varnished side of the plate towards you, you can perceive at a glance whether you have touched up as you desire or not. Any degree of boldness, together with porcelain softness, is thus obtained with the practised hand. The negative should be printed under at least *one* ground glass after the marked paper is placed in the negative. The above is not original with myself, *but as I have proved its practical value* I can recommend it for the purpose to which it is destined.

AWAY-FROM-HOME PHOTOGRAPHY.

[A communication to the London Photographic Society.]

THE series of views in the late Exhibition, Nos. 140 to 151, about the production of which I am asked to furnish some particulars, were all taken by the ordinary wet collodion process, and at a considerable distance from my residence. Nos. 141 and 146 were prepared and developed in one of Murray and Heath's box tents; Nos. 140, 142, 144, 149, 150, and 151, in a Clarence carriage, temporarily adapted for the purpose by covering the windows with orange paper; and the Welsh views, Nos. 143, 145, 147, and 148, in an omnibus. So far as manipulation is concerned, I am not aware that any difference can be detected in the pictures taken under the three different conditions; but there was a very great difference in the difficulty and labour involved. It cannot be doubted that a good tent is most useful; but practice has shown me that, for carrying on photographic operations at a distance from home, nothing can compare with an omnibus properly fitted up as a dark room. Tents, even of the most approved construction, involve a great deal of labour in setting in order and packing up again, to say nothing of the time consumed—a serious matter in this country, where atmospheric conditions are so rarely favourable.

An omnibus allows in its interior a place for everything, and abolishes all packing, with the exception of screwing the india-rubber top upon the nitrate bath. On reaching the scene of action nothing has to be done, after the horses' traces are slipped off the bar, but to open the door and find everything requisite ready to hand. Another important matter is that the silver bath and developing-tray are so placed as to allow the operator to sit down while coating and developing, &c. Only those who have had to march to and from the camera all through a midsummer day, with no other rest than to stand tied up in a tent, can appreciate the luxury of a seat. The fatigue produced by a day's photographing on large plates is reduced three-fourths at least—it makes, in fact, the difference between hard labour and pleasant exercise.

The negatives are 13 × 11 inches. This size was adopted as being large enough to allow architectural details to be well seen, or a bold subject to be treated without presenting manipulatory difficulties; while they are available for the portfolio and album, and not ineffective when framed.

The glass employed is Forrest's patent plate substitute, thoroughly cleaned and albumenised by means of a Blanchard brush. Were it not for the security which this preliminary coating gives against slipping, tearing, or splitting of the film, either during washing, fixing, or drying, I should gladly omit it; for, unquestionably, every film that is laid upon a plate contains its own peculiar specks and imperfections, no matter how carefully operations are conducted. Without albumen the adherence of the collodion film is very imperfect; with it, just the reverse. Water, hot or cold, can be dashed on without misgiving; while any damage to the edges caused by the grooves of the draining-box does not endanger the negative by spreading further.

The negative bath is made simply by dissolving a given quantity of the best recrystallised nitrate of silver in rain water drawn from a slate cistern. The strength is thirty-five grains to the fluid ounce. To each bottle containing the solution a few drops of saturated solution of bicarbonate of soda are added. After a thorough shaking the bottles are placed on a shelf in full sunlight. The contents speedily blacken, and a dark sediment is finally deposited, which will be more or less in quantity according to the purity of the materials made use of. When the supernatant fluid is perfectly bright and clear, filter into the bath-holder through a glass funnel, at the bottom of which is thrust a pledget of well-washed cotton wool. This is better than filtering-paper, is not so wasteful, and its purity more to be depended upon. Add cautiously a very little nitric acid, and stir well after each addition. Use no more acid than will just suffice to redden litmus paper in a slight degree after an immersion of several moments. I add no iodide, as most of the manuals recommend, for the reason that it can be dispensed with, and the bath keeps longer in good order without it. True, a little care is required in exciting the first few plates; but if the dipper be kept constantly in motion, and the plate withdrawn as soon as ever the greasy lines disappear, there will be nothing to fear from the iodide leaving the film, and the bath itself will continue to improve with every successive plate that is dipped into it.

My bath-holder is a brass-bound mahogany case, lined with the purest sheet india-rubber. It is no larger than the glass bath generally used, and no heavier than the case in which the glass bath is contained; it is much less expensive, and there is no fear of breakage, while the solution remains just as unaffected as it would be by glass. These are important advantages, and well worthy of the consideration of the away-from-home photographer. I have had one of these india-rubber baths in continual use since November, 1872. It is large enough for plates 20 × 16 inches, and holds a little more than two gallons. During all this time I have never had any more trouble with the contents than sunning and filtering would remove. The dipper is a piece of flat plate glass, to the bottom of which a thicker piece of plate glass is cemented. There is, therefore, no projection to cause currents in the dipping-bath and mysterious markings on the plate.

The developer is prepared thus:—

Protosulphate of iron	1 pound.
Sulphate of iron and ammonia	1 „
Sulphate of copper	½ ounce.

Put the whole into a Winchester, fill up with hot rain water, and shake thoroughly. When cold the solution is saturated, and one fluid ounce of it contains thirty grains of the iron salt. Fill up the bottle from time to time as required, always taking care to have a good deposit of crystals at the bottom.

For general use I take—

The above saturated solution, filtered	3 ounces,
Glacial acetic acid	½ to 1 ounce,
Water	16 ounces,

and, as a Good Templar would say, "no alcohol" except when required, which will be when the developer ceases to flow smoothly. When this occurs, add no more than is just necessary to overcome repulsion. Alcohol tends to the production of stains and streaks, especially in the sky of a negative.

This thirty-grain solution is stronger than is recommended by the manuals for outdoor use; but I employ it because it reduces the exposure and gives a denser image, especially in the skies—the weak point in most landscape negatives. Moreover, it serves better to bring out the details of foliage and a turf foreground in shadow. Do not be afraid to allow the developer to remain on the plate; keep it there till its work is done, and fears of fog need not be apprehended.

Washing, fixing, and intensifying I leave to be done at leisure on my return home. As soon as sufficient detail and density have been gained let the developer run off, and then flood the plate with the following mixture:—

Glacial acetic acid	1½ ounce.
Water	1 pint.

Wash this well over the plate for a moment or two, drain off into the sink, and then flow again with the acid solution, and your plate can remain without further attention for some days. Exposure to light has no injurious effect upon it, not even the fierce beams of a midsummer sun. Place in a grooved draining-box, in the bottom of which is some wet blotting-paper. So long as the plate remains moist all is well; but should any signs of drying be apparent (as may happen sometimes) flow again with the acid and water.

By leaving the negative in this partly-finished state there is an enormous saving of time and labour, to say nothing of the pleasure of being able to dispense with so disagreeable a travelling companion as hyposulphite of soda. It will be observed, too, that another troublesome thing is dispensed with, namely, water. All washing can be left until reaching home. When worked in this manner the wet process comes into strong competition with dry plates.

I generally leave the negatives in the draining-box until the next morning, when they are thoroughly washed, and afterwards exposed to the full beams of the sun until dry. This operation nearly always gives the negative all the density that is needed for printing well, and does it in a more even and harmonious manner than is possible by the use of chemicals.

When thus washed and dried the negatives can be either finished immediately or left in this state for an indefinite period. When away from home on a tour I simply wash and sun-dry the plates as above, and leave them till my return, which may be in a week, a month, or longer. Some negatives I took in Wales last August now remain in the plate-box in this condition. The convenience attendant upon this proceeding scarcely requires pointing out.

I always fix in a wooden tray containing a saturated solution of hyposulphite of soda. Before the negative is immersed in the fixing bath, however, it must be well wetted all over under the tap, otherwise destructive markings will ensue.

When thoroughly fixed wash the plate well with hot water, which will effectually get rid of all traces of hyposulphite in less than half the time that cold water would require; but it is advisable to give a final rinse with cold water.

Upon now holding the negative up to the light an accurate opinion can be formed as to its qualities. The colour will be brownish, and, in all probability, it will be sufficiently dense to yield a good print, although to the eye it may look somewhat thin.

But should it appear that more intensity is wanted prepare the following solution:—

Iodine	20 grains.
Iodide of potassium	40 „
Water	1 pint.

Take sufficient of this port-wine-looking mixture, and with one sweep flood the plate; keep it flowing to and fro for a minute or so. It will sometimes happen that this operation will produce sufficient intensity, for it clears the shadows and produces contrast. Its object is to prevent all danger of fog or stains in subsequent operations, and it serves to facilitate the action of the intensifier, which is thus made:—

Pyrogallic acid	45 grains.
Citric acid	10 „
Glacial acetic acid	1 ounce.
Rain water	20 ounces.

Now go into the dark room, and pour sufficient of the above into a developing-cup and flow well over the plate, leaving it there. Then add to the solution remaining in the measure a few drops of a twenty-grain solution of nitrate of silver (more or less according to the degree of density needed). Begin with a little; more is easily added afterwards. Give the measure a circular shake, and drain into it the solution that remains on the plate. By this means a complete and intimate mixture is obtained, and a smooth, even flow over the negative ensured. Pour on and off the negative until the requisite depth is reached. Take care not to make the negative too dense, for the action of the intensifier is very energetic.

I recommend the above method to all those who find a difficulty in getting enough density. It is the result of a patient trial of all the formulæ which have been published during the last half-dozen years.

It is preferable to intensify after fixing, because one is so much better able to judge of the exact density gained.

After a thorough and final washing the plate is ready for varnishing. I prefer to dry by a clear fire, and put aside until cool enough to receive the varnish. The glass should be just warm enough to prevent the varnish from chilling, and no more. The warmth should be uniform all over. By keeping the plate cool the varnish flows better, and lines are not produced at the edge of the wave of varnish should its continuous flow be momentarily arrested. If one of these circular hair-like marks appear keep the plate horizontal for a longer period than is usual, and the mark will generally disappear—at any rate, sufficiently so not to show in the printing. I use Mawson and Swan's extra-hard varnish, because it neither becomes sticky nor peels off, which is more than I can say of any other varnish I have tried.

Having now described the chemical operations this paper comes appropriately to a conclusion. It was my intention to add some hints upon the mechanical work in the field, the result of the experience gained in taking a considerable number of negatives, but I find space prohibits it. Should there be sufficient interest felt I will draft my memoranda into a second paper.

Finally: I wish to say that for the application of dilute glacial acetic acid to arrest the development I am indebted to an article published some time back by Mr. Wilkinson, and to Mr. B. J. Edwards for the admirable formulæ for developer and intensifier.

EDWARD VILES.

FOREIGN NOTES AND NEWS.

M. DAVANNE'S VERSION OF THE TAUPENÔT PROCESS.

WE will now fulfil the promise made in last week's *Notes*, and give M. Davanne's version of the Taupenôt process, as communicated by him in a recent lecture on photography to the young engineers at the "Ecoles des Ponts et Chaussées."

We are told, in the first place, that the manipulation of this process, although long and delicate, leads to great certainty of result, combined with much sharpness and vigour in the proofs. The first operation consists in applying to the glass plate a preliminary coating of diluted albumen. The plate must be cleaned with the most scrupulous care. The plan recommended is to clean it with an alkaline mixture of chalk and ammonia, then to wash it with dilute nitric acid, and then to polish it; after which albumen diluted with about sixteen parts its bulk of water is poured or spread over it, and it is set up to dry. Here we may remind our readers of what Mr. R. M. Gordon's practice is on the subject of plate-cleaning, viz., to use tripoli and alcohol, which, he says, make the film adhere much more tightly to the glass than when it has received a wash with acid. He greatly prefers tripoli to chalk.

The plate is then coated with bromo-iodised collodion and excited in a thirty-grain nitrate bath containing three or four drops of nitric acid to every ounce of the solution—an intensely-acid bath. After an immersion of three or four minutes it is removed and well washed; then coated with bromo-iodised albumen, made according to the following formula:—

Clear albumen	100 cubic centimetres.
Iodide of ammonium	1 gramme.
Bromide	½ "
White sugar	2 grammes.

The albumen, before being beaten up, is to be diluted with one-tenth part of water and one hundredth part of glacial acetic acid. Instead of sugar, twice the quantity of dextrine, dissolved in a little water, may be added if the operating-room be damp. The plate is now to be put away to dry spontaneously, and is then quite insensitive to light, for the bromide, as well as the iodide, of silver which the collodion film contains, is rendered insensitive by the free iodide and bromide of ammonium in the albumen.

The plate is excited in a bath of aceto-nitrate of silver containing thirty grains per ounce of the nitrate and thirty minims of glacial acetic acid. It is then well washed with water and dried. In this state it is ready to be exposed, and should not be kept more than two or three days. For plates which are intended to be kept indefinitely the following treatment must be adopted:—Whilst still wet with the last washing water a strong aqueous solution of gallic acid, even to saturation, must be poured over them, and be allowed to dry on.

The time of exposure admits of considerable latitude, because errors may be to a great extent counteracted by the mode of development employed. This consists in first wetting the film with water, and then pouring over it a mixture of gallic and pyrogallic acids, acidified with acetic acid, to which are added a few drops of a solution of nitrate of silver. The formula is as follows:—

Water............................	1,000 cubic centimetres.
Gallic acid	2 grammes.
Pyrogallic acid...	3 "
Glacial acetic acid..............	15 "

To 100 cubic centimetres of this liquid must be added two cubic centimetres of a fourteen-grain solution of nitrate of silver. In cold weather the developer should be heated to thirty or forty degrees centigrade before adding the silver. The development proceeds slowly, and a deposit which forms upon the film must be occasionally brushed off. The best mode is to put the developer into a dish, and place the plate in it, film downwards, resting upon suitable supports. When the image appears to be coming out in too strong contrasts, owing to under-exposure, the quantity of nitrate of silver added must be reduced, and conversely.

The development may occupy from ten minutes to many hours. When the development is finished the negative must be washed, and fixed with hyposulphite of soda in the usual way. Owing to the hardness of the albumen film the fixing process is longer than with an ordinary wet plate. Should the negative not appear to be dense enough when fixed it may be re-intensified with acid pyrogallol and silver. The final operation consists in varnishing the proof in the usual way.

Not a word is said by M. Davanne about the alkaline development of a Taupenôt plate, probably because he was addressing young engineer students and not advanced photographers, and did not wish to introduce any complications. We must be taught to walk before we can run, and must advance in all our studies step by step. Our author's neglect to allude to alkaline development did not, we feel persuaded, arise from any want of appreciation on his part of that method of development.

There is one part of the process to which, we think, exception may be taken, namely, that in which it is recommended to apply to the film, in the last stage of its preparation, a wash of a *saturated* solution of gallic acid. Some months ago, in an editorial article in this Journal, it was shown that when this solution of gallic acid is too strong there is some risk of its crystallising upon the film. This was proved by a microscopic examination of a film thus treated. It is probable that a grain, or two grains at most, of gallic acid to the ounce of water will be found strong enough; at any rate, the error, if it be one, will lie on the safe side.

The last number of the *Bulletin* of the Photographic Society of France, having been published whilst the Society was *en vacances*, contains nothing but extracts from other journals. We observe that six entire pages of it are devoted to a reprint from the *Moniteur* of Mr. Sutton's articles on the two moist processes in which the films are washed and coated with a preservative of albumen and glycerine

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

AT an ordinary meeting of this Society, held on Thursday, the 12th inst., the chair was occupied by the Rev. F. F. Statham, M.A., F.G.S., the President.

After the proceedings of the previous meeting had been read and confirmed, Mr. W. T. Atwood and Mr. Reid were elected ordinary members of the Society.

In accordance with the rules of the Society, several names were then proposed for filling the offices of Vice-Presidents and members of the Council. These will be ballotted for at the next meeting in December.

Mr. Jabez Hughes read a paper *On the Establishment of a British Photographic Congress*. [See page 557.]

The sense of the meeting was decidedly in favour of the establishment of such a Society as that suggested, and a committee was nominated and appointed to ascertain the feeling of photographers throughout the country relative to the desirableness of forming such a Society as that recommended. As the names of several gentlemen were proposed in their absence, it is not expedient that they should be published at present; it is sufficient to state that the committee is thoroughly representative, and embraces the names of several gentlemen who are not connected with the South London Photographic Society. Thanks were awarded to Mr. Hughes for his paper.

It was intimated that the annual dinner of the members would be held on Thursday, December 17th, and that at the next ordinary meeting a paper *On the Practice and Principles of the Great Portrait Painters* would be read by Mr. Aldridge. The meeting was then adjourned.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of this Association was held on Wednesday, the 11th inst., at 12, York-place, Portman-square,—T. Sopwith, Esq., M.A., F.R.S., in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Henry V. d'Esterre, Esq.; Allan H.

Stenning, Esq.; W. Horsman Kirby, Esq.; G. Moore, Esq.; Thomas Hutchison, Esq.; A. L. Stevenson, Esq.

The Secretary then laid before the meeting the following prizes, which had been awarded at the last meeting:—*First Prize*—F. Beasley, Esq., a large silver goblet; W. T. Hobson, Esq., a silver goblet; J. H. Ravenshaw, Esq., a silver goblet; Colonel Rocke, an oil painting, by Masters, in gilt frame; Sir Jocelyn Coghill, a large album, handsomely bound in morocco; Captain White, an oil painting by McEvoy; Major Allen, an oil painting, by Masters, in gilt frame; D. Knapping, Esq., a large album, handsomely bound in morocco; J. McAndrew, Esq., a graphoscope; T. Brownrigg, Esq., an oil painting, by McEvoy, in gilt frame; G. Brewis, Esq., a large album, handsomely bound in morocco; Captain Lewis, an album, handsomely bound in morocco; R. O. Milne, Esq., an album, handsomely bound in morocco; Captain Toke, an album, handsomely bound in morocco; R. Murray, Esq., an album.

Certificates of honourable mention were awarded to W. G. Hunter, Esq.; Captain Layton; J. W. Richardson, Esq.; Rev. W. E. Hancock; and Mrs. Hancock. A. J. Melhuish, *Hon. Sec.*

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The preliminary meeting for the formation of this Society was held at the New Inn, Bradford, on Monday evening last, the 16th inst. Although the weather was very unfavourable for those who had to come any distance the larger towns were well represented, besides Bingley, Sowerby Bridge, and Brighouse (the latter represented by proxy). It was an agreeable surprise to find, numerically speaking, that the gathering presented a rather formidable appearance, considering it was an inaugural meeting, and that two or three of those present had been members of a society in existence in Bradford some sixteen years ago, and who evidently had not allowed their photographic enthusiasm to abate in the meantime. In point of photographic ability, names could be selected from those present that would be recognised as prominent amongst the foremost in the "black art."

Mr. J. W. Gough was called to the chair, and, after some discussion, that gentleman was induced to accept the combined offices of chairman and secretary. A committee was then elected, composed of the following gentlemen:—Messrs. Greaves, Rogerson, Sachs, Barrow, and Gough.

Mr. Berlon proposed that the whole Committee should not be appointed at that meeting, so as to permit of other towns being represented; and that, with this object in view, the Committee should have power to increase their number by the appointment of three additional members.

This resolution was passed; and it was also resolved that the officers be members, *ex officio*, of the Committee.

The Chairman said that the great aim of the Society was to cultivate good fellowship amongst the brethren of the photographic craft; to aim at mutual improvement in its character; to require of its members to contribute to the intellectual well-being of the Society by reading papers occasionally, or by contributing information in an informal or conversational manner; by showing the success they had attained in working out anything new or old under special conditions; by recording their failures—in fact, if they had made a photographic discovery of any kind to bring it forward to be discussed by the Society. To compare themselves with those working in the same direction was the only way of arriving at a true estimate of their own abilities. Occasional exhibitions would, therefore, be highly beneficial, besides having "popular evenings" with the lantern, showing not only the work of the members of the Society, but the best that could be obtained from any quarter, which very frequently was of the highest educational value, independent of their photographic recommendations, and would induce visitors possessing but a slight acquaintance with their art-science to attend those occasional meetings. The Society should be governed on the strictest principles of economy—say to make the annual subscription 5s., the Committee having power to levy an additional 5s., but no more, to meet any exigency, unless the Society, by some outburst of enthusiasm, should be willing to levy a heavier tax on their purses.

The meeting accepted the Chairman's remarks as skeleton views to be elaborated into laws.

The Chairman hoped that as soon as attention could be given to the compiling of the laws the Society would be kept purified from those trade influences which had so frequently disturbed the peace of other photographic societies.

Several gentlemen expressed concurrence in the Chairman's remarks as to the necessity of suppressing any bias in the trade direction, some even suggesting how it could be legislated against. As, however, there was some difference of opinion as to the mode of dealing with and obviating this evil, and upon the means to be employed for such purpose, it was decided to be premature to endeavour to settle the question at that meeting. It was then arranged that the hour for holding the meetings be half-past seven o'clock. It was also determined to meet once a month during the entire year, the precise date for holding the meeting being left to be fixed at the next meeting, but Monday was arranged as the most convenient day of the week for the generality of the members.

A Sub-Committee, composed of Messrs. Rogerson, Barrow, and Sachs, being resident members of the general Committee, was appointed to make inquiries and engage suitable rooms for the monthly meetings. Mr. Berlon also expressed his readiness to render assistance to these gentlemen in the undertaking.

The meeting was then adjourned till Monday, the 30th inst., for the completion of the arrangements and the drawing up of rules for the government of the West Riding of Yorkshire Photographic Society.

Correspondence.

REPRODUCING NEGATIVES.—A RECLAMATION.

To the Editors.

Gentlemen,—I find that in England the process for reproducing negatives by "dusting on" is generally attributed to Herr Obernetter. Allow me to draw your attention to the fact that I published full directions for this process in the *Photographisches Archiv* of July, 1871; that in July, 1872, MM. Geymet and Alker published the same process in Paris; while Herr Obernetter's publication dates from March, 1874—the only difference in all the processes being in the formula, and that I recommended powdered French black "*cônte*" chalk, while MM. Geymet proposed plumbago. The process recommended by me in 1871 has been in practice since that time in several establishments where the lichtdruck process is worked, especially at that of Herr C. H. Jacobi, at Neuendorf, near Coblentz.

I enclose a translation of my article in the *Photographisches Archiv*, July, 1871, from which you will see that I distinctly described the process for reproducing negatives.—I am, yours, &c.,

Düsseldorf, Nov. 14, 1874. P. E. Liesegang, Ph.D.

[The article alluded to by Dr. Liesegang will be found in another page.—Eds.]

TONING TRANSPARENCIES.

To the Editors.

Gentlemen,—As the winter has fairly commenced doubtless many of your readers are busy in the preparation of lantern slides. Allow me to give in your columns a friendly warning against the use of gold or mercury for toning them.

For several years I used gold solution, and felt confident that, if it were used carefully and the transparencies well varnished afterwards, I had nothing to fear. I was warned by a friendly correspondent that this was a delusion, but thought it improbable that they would change. I now find, on looking over my slides, that a decided change *has* come over some of my own and many others received from friends, which I know were toned with gold.

I also see that one London photographer, Mr. F. York, wisely announces that all his slides are toned with platinum.—I am, yours, &c.,

Northampton, Nov. 17, 1874. Lanternist.

[We have toned numerous transparencies with gold; but our experience has been quite unlike that of our correspondent, for we cannot discover that any pictures toned with gold have faded. With regard to the shortcomings of mercury in this respect we have uttered many notes of warning.—Eds.]

PUFFING.

To the Editors.

Gentlemen,—In your report of the last meeting of the London Photographic Society I find it stated that a certain gentleman, a member of the Council, made an undisguised attempt to chant the praises of the wares of a fellow-councillor. Now, if old members of the Council set such an example, will it be surprising if the meetings are gradually turned into occasions for advertising?

Trusting that the Society will take the matter into consideration at an early date, so as to prevent any repetition of this conduct—at least, by any of the governing body—I am, yours, &c., A Former Member.

November 18, 1874.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—Referring to the report of our first general meeting of the above Society—and to which, no doubt, you will give space in the portion of the Journal usually devoted to the reports of the meetings of photographic societies—permit me to here add a few additional remarks respecting our inaugural meeting.

The gentlemen present displayed great earnestness with respect to the future prosperity of the Society. As it is evident that our number would be tolerably large it was thought expedient that the "popular evenings" should not be confined to Bradford alone, but occasionally take place at Leeds and Halifax. The midsummer excursions will, of necessity, take the members to all points of the compass, so that the three larger towns just mentioned will attract the members most in proportion to the excellence of the photographic "bill of fare" they can offer to the members of the Society.

I must now beg that the gentlemen who have been kind enough to write to me from a distance will accept my apology for not communicating with them individually; but I hope they will enrol themselves as members, and in the meantime put forth all their energies to increase our strength, and make us the veritable West Riding Society.—I am, yours, &c. J. W. GOUGH.

Akroydon, Halifax, November 17, 1874.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED.—

C. Sanderson, Preston.—*Three Portraits of the Rev. Geo. Gillow.*

John Wilson, Hartlepool.—*Photograph of Hartlepool Channel and Town Wall.*

E. Eccles, Bury.—*Five Portraits and Groups of the Rev. R. Brewin, an African Boy—"Dado," and Nelly Wakefield.*

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

QUONDAM REDON.—The prints will be forwarded.

E. OBORNE.—Thanks for "opinion of counsel" *re* Entrekin's burnisher.

S. W. G.—Apply to Mr. Werge, Berners-street, the only person in London who keeps them in stock.

F. YORK and WALTER B. WOODBURY.—Notices of the lantern works and catalogues of these gentlemen will appear in our next.

H. D. ATKINSON.—We can suggest no remedy but the somewhat unscientific and old method of applying the tongue to the surface of the print.

CAMDEN.—The negative taken on the gelatine was unfortunately broken when it reached us; but we can see plainly enough that the process, in your hands, will prove highly successful.

MEDICUS.—To cure the flare in your portrait lens try, first, the effect obtained by placing the stop close to the front lens; and, secondly, altering the distance between the front and back lenses.

G. W. J.—You have omitted to read the opening paragraph of the article referred to. If you peruse it you will find that too high a temperature will have a disastrous effect upon the film.

A. FINDLOW.—Such an apparatus as you describe can now only be obtained second-hand. It will cost about two pounds. That, at any rate, was the price we paid for one a few weeks ago.

R. R. B.—The inside of the operating-box may be stained a good black colour by boiling logwood in water with the addition of a little washing soda, and applying this three or four times. After it is dry apply a solution of protosulphate of iron.

S. J. F. (Birmingham.)—Your knowledge of the history of photographic processes must be singularly defective, or you would not ask such a question. In former volumes of this Journal you will find innumerable articles descriptive of photolithographic processes, all open to the world.

HYP. CHLOR.—The addition of a little ammonia or cyanide of potassium to the red collodion will remove its colour if that be all that is required; but, as to the working qualities of the collodion being improved by such an addition, *that* is a different matter entirely, and from the tenor of your letter we imagine it is a matter of indifference. With such a large quantity as three gallons of old and red collodion we would recommend distillation, so as to remove the ether.

H. R. R.—1. The mode of ascertaining how many grains of dried albumen are equal to the white of one egg is to pour an ounce of albumen into a shallow vessel made of ordinary tin, place it in a slow oven till the whole is desiccated, and then weigh the product.—2. Although we have never used alcohol for the purpose suggested in connection with plates of that kind, it is well worthy of a trial.—3. Backing is not necessary if the collodion has been strongly iodised.

AN OLD AND NEW MEMBER.—As neither the letter you have sent for publication nor the private letter by which it was accompanied have your name or address attached we must decline to publish it. We have received several others on the same subject, which have been duly attested. The editor of the Society's journal acted properly in not inserting your letter. If you be, as you say you are, a member, why not adopt the honourable course of bringing the subject forward openly at the next meeting, instead of venting your grievance in anonymous letters?

P. C. F.—The remedy for your trouble is simple. You must either decrease the proportion of bromide in the collodion, or increase the strength of the nitrate of silver bath. When the haloid salt is in excess in the collodion the iodide or bromide of silver invariably breaks away from the collodion film in the manner you have experienced. Seven grains of bromide to the ounce of collodion is by far too large a proportion for a forty-grain bath. Let the bath for this proportion be one of from sixty to eighty grains, and let the plate remain immersed for ten minutes to effect the thorough formation of bromide of silver.

A. M. BEER (Leeds).—This correspondent says:—"I shall feel obliged if you will inform me what diameter the condenser of a magic lantern should be to use with a 1½ inch or 1¾ inch diameter portrait combination. Also, whether the above-named lens or a three inch one would be the more effective as a front lens to the lantern. As I am preparing to make a large one, and have the lenses on hand, I wish to use the most suitable."——We reply:—For an ordinary quarter-plate portrait combination, such as we presume is meant by our correspondent, a condenser four inches in diameter will answer very well, for it will illuminate a three and a-quarter-inch circle. A large portrait lens to be used as a lantern objective is only desirable when it is necessary to have the lantern placed at a considerable distance from the screen.

C. E.—You are slightly confused in your ideas respecting French weights and measures. A cubic centimètre is the unit of French liquid measures; and in the case of water it weighs one gramme, or 15·4 grains.

ENGRAVER.—Several methods for photographing upon wood blocks have been published, but none of them are, in our opinion, better than, even if so good as, the one described by us in a former volume in which the carbon process of printing is adopted. At the time of writing the article describing that method, we produced a photograph on wood and handed it to an engraver with a view to having his opinion respecting its efficiency. He reported very favourably of it, stating that it did not clog the graver nor affect the surface of the wood. The principle of that process is that a pigment paper must be used that is loaded with carbon to the utmost extent it is capable of bearing, so that with a film on the wood of minimum thickness there shall be a maximum of colouring matter.

EXCHANGES.—In our next.

LONDON GAZETTE, *Tuesday, November* 17, 1874.

PARTNERSHIP DISSOLVED.

HUDSON AND PURNELL, Ventnor, and PURNELL AND HUDSON, West Dulwich, photographers.

FADING AGAIN.—At the Southwark County Court, on Wednesday last, the case of Ayling *v.* Hyde was heard before the presiding judge, where the plaintiff sued to recover the sum of £4 for mounting and binding a number of photographic views, the property of the defendant, a shipowner residing at Newcastle. The plaintiff opened his case by stating that the defendant employed him to mount in two volumes a series of photographs of India at the time of the mutiny. They were large photographs, exceeding a hundred in number, and were handsomely bound in two volumes Russia extra. The charges were fair and reasonable, and the defendant never complained till pressed for payment of his account. This was the plaintiff's case. The defendant, who was represented by Mr. Willis, solicitor, stated that the photographs entrusted to the plaintiff were of a very valuable character—intrinsically so, but more so as for family considerations—and that they had been entirely spoiled by the manner in which they had been mounted. Some of them had turned yellow, and others had been entirely destroyed round the edges. The defendant called skilled witnesses, who proved that the photographs had been mounted with starch which contained some injurious matter, and which had tended to destroy the photographs. The plaintiff denied this, and said that the pictures were not mounted with starch, but with the purest gelatine he could get. The photographs being produced in court were shown to be seriously injured, when the learned judge ruled in favour of the defendant, upon which the defendant's solicitor gave notice of a cross-action for the damage he had sustained through the plaintiff's negligence.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 761. Vol. XXI.—DECEMBER 4, 1874.

ON WARMING THE STUDIO.

The best means of warming the studio is to many, at this season of the year, a subject of considerable interest, and one that is in most cases beset with no little difficulty. With studios that have been erected under advantageous circumstances, both as regards locality and capital, the question is simple enongh, any one of the numerous stoves that have from time to time been recommended in our columns or advertising pages answering the purpose admirably; while those who have an objection to stoves in general can arrange for an open fireplace, which, after all that has been done by the inventors of heating apparatus, seems, in this country at least, to be preferred to all other methods of heating.

There are, however, throughout the country a large number of studios in which the poor photographer is not so fortunate—studios in which, from their cramped situation and want of a chimney, an open fireplace is out of the question and a suitable stove cannot be erected at all, or, if it be, its regulation is a matter of such difficulty that the operator is at one time perspiring in a tropical climate, and probably within a couple of hours afterwards is as uncomfortable as if he were in the frigid zone, to say nothing of the inconvenience and injury to health caused by the escape of the products of combustion into the limited atmosphere.

In many parts of the country the gas stove, in one or other of its forms, is very generally used in photographic *ateliers*, and as in numerous cases no attempt has been made to carry off its injurious products it is not difficult to account for the headaches, lassitude, and disinclination for exertion of which the operators so frequently complain. Nor is it the gas stoves only that are thus objectionable; the ordinary cast-iron stove, even when the chimney is in direct communication with the outer air, is hardly less so, in consequence of the curious fact that that metal at a red heat is quite pervious to carbonic oxide—one of the most injurious products of the combustion of coal or coke.

We have already, in this Journal, described "George's patent calorigen," and spoken of it in terms of high commendation on account of the sound principles upon which it is constructed; for by it *none* of the products of combustion can possibly escape into the apartment in which it is placed, nothing being admitted but a stream of pure heated air. This stove is, we know, in high favour with many photographers.

Another excellent stove for use in a limited area, and one also free from the objection just mentioned, is known as "Stark's stove," having been invented by Dr. Stark, Registrar-General for Scotland, and described by him before the Royal Scottish Society of Arts nearly twenty years ago. It consists of a thick, cast-iron cylinder nine inches in diameter and eight in height, set on a row of fire bars on a suitable base, and forming the fireplace of the stove. Over the cast-iron cylinder is placed a cylinder of *sheet* iron large enough to leave a space of a quarter of an inch between the two all round, and thirty inches in height. This is covered by a movable top, which may be replaced by suitable rings for dishes requiring to be heated, and forms a valuable addition to the apparatus of the amateur laboratory. The stove-pipe comes out a few inches below the cover, and there is a door, the lower part of which is on a line with the top of the fireplace; an arrangement by which the supply of air that enters under the bars is regulated completes the stove. It is easily started, and burns dross or small coal as well as, if not better than, larger pieces. When only a little heat is required the supply of air may be so regulated as to keep it smouldering for five or six hours without any attention whatever. Its principal advantage, however, lies in the large area formed by the outer cylinder, in which the heated air and unconsumed gases collect, and, before passing up the pipe, yield a large portion of their heat to the sheet iron, which radiates it through the room, but which refuses to transmit the carbonic oxide, and so gives any necessary amount of warmth without in any degree rendering the air impure.

Good, however, as the stoves mentioned are, there may be conditions in many studios which would render their introduction inconvenient, and where such an arrangement as we recently saw in most successful operation will be found to answer admirably. It consisted in an application of the ordinary method of heating by water, carried out in such a simple way as to be within the reach of almost any photographer, and suitable for almost any studio, however small. The boiler, which held only one gallon of water, was of copper, and in form something like a wash-hand basin inverted, with a concave bottom brazed over the mouth. Through this inverted basin passed a copper tube an inch and a-half in diameter, and brazed top and bottom, terminating about a foot above the top of the boiler (the bottom of the basin). This tube was continued by a tube of tinned sheet iron of the same diameter up through the roof, and was intended to carry off the products of the combustion of three Bunsen burners, by which the boiler was heated.

The boiler stood on a tripod about eighteen inches from the floor, and was supplied with water from a tin pitcher holding about two gallons, and near at hand on a shelf at an elevation of three feet. The connection between the cistern and boiler was made by a three-eighths copper tube, which entered at the bottom of the latter, and as the consumption of water was next to nothing it required but little attention. From the bottom of the boiler, which stood near the entrance to the studio, there was carried an iron tube of an inch and a-half in diameter round the room to the opposite side of the door, where it was bent and carried back again, and entered the boiler near the top.

Air tubes of small diameter, to promote the circulation, carried to a little above the level of the cistern, completed the arrangement, and required so little attention that it had been in constant use night and day for some weeks, maintaining an even temperature of about 58°, with absolutely no more attention than an occasional glance to see that the cistern contained plenty of water, and at a cost of only a few pence per twenty-four hours.

We were informed that the cost of the boiler, Bunsen burners, tripod, and cistern was thirty-four shillings, and that the tube cost about eightpence per foot. This estimate will enable our readers to calculate for themselves the price at which their studios and dark rooms, should they be on the same level, may be comfortably, cleanly, and economically warmed.

CONVERGING PERPENDICULARS AND SWINGING CAMERA FRONTS.

A camera maker asks us if it be correct, as mentioned to him by an optician, that the use of a swing front strains the lens. From this we imagine that an article in our last Almanac on the subject of swing backs and swing fronts has either obscurely expressed the intention of the writer or may have been misunderstood. We desire in this article to further elucidate the subject, and clear away any mist or fog by which it may still be surrounded.

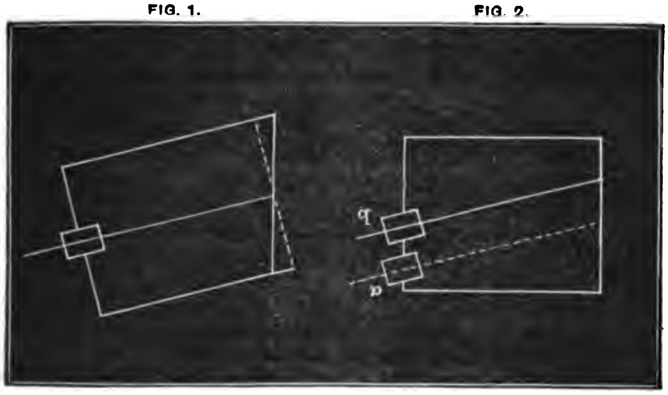
Placing out of sight for a moment the pictorial reason why either the swing front or back is used, we may observe that *optically* the object of either of these contrivances is to place the plane of the ground glass or sensitive plate at an angle to the axis of the lens other than the right angle which results when a rigid camera is used. In a camera with a movable or swinging back this condition is fulfilled by simply sloping or swinging the frame containing the ground glass. Hence it must be obvious that, whether the lens be tilted in relation to the focussing screen or that screen in relation to the lens, the effect produced is precisely the same.

Here we may observe that the object of this movement is twofold:—First, in the photographing of architectural subjects it permits the sensitive plate to be placed in the same vertical plane as the building to be reproduced, and thus ensures freedom from that obnoxious and at one time very common form of distortion known as "convergence of the perpendicular lines." Secondly, in the photographing of ordinary landscapes, as contradistinguished from architectural subjects, it permits the foreground to be sharply rendered, which, without such a contrivance, it could scarcely be unless a very small stop were employed. The foreground being so much closer to the lens than the distant objects has its focus farther from the lens than that of the distance, and this foreground can only be sharply rendered by tilting back the upper portion of the ground glass.

Both of the movements described may be obtained with a rigid back and a swinging front. Suppose that the camera were pointed slightly upwards in order to get in the whole of a building in front, then the lines would converge. Suppose, again, that the camera were placed quite square so that the lines did not converge, what then? The top of the building would not be depicted at all. Suppose, for the third time, that the lens were pointed upwards leaving the camera standing still as it was, matters will not be much improved, because the axis of the lens will now be directed not to the centre of the plate but towards its lower end.

These positions will be seen very plainly from the accompanying diagram, in which *fig.* 1 is a camera with a swing front but a rigid

FIG. 1. FIG. 2.



back. When the lens is in its central or normal position, as at *b*, and then turned upwards, its axis is directed towards the bottom of the plate, whereas it should be towards the centre. In order that it shall be thus directed it becomes necessary that provision be made for raising the lens in its relation to the front of the camera, as shown at *a*, by which (as indicated by the dotted line) its axis is directed towards the centre of the plate, as it ought to be. In *fig.* 2 we see how the camera with the swing back acts under the same circumstances as that with the swing front. Both are directed upwards with the same degree of slope, the relation of the axial angle to the ground glass is similar in both, and both of them have the ground glass placed in a vertical position; therefore the pictures obtained by them will be absolutely identical.

In taking a foreground the opposite conditions will result. The camera must be directed upwards, and the lens depressed and pointed downwards. The exact amount of adjustment required in either case must be ascertained by experiment.

From the foregoing it will be seen that everything that can be effected by means of a swing back can be obtained by a swing front; but, as regards convenience and simplicity in working, the movable back is far superior to the other arrangement, for the effects can be seen and the adjustments made with a greater degree of facility. Into the mechanical means by which the swinging of either the fronts or the backs of cameras is effected we do not here enter, the subject being so fully treated in our last Almanac; but we must emphatically remark that no camera for landscape or architecture can be considered complete which is deficient in one or the other of these appliances. Have the back made movable, if possible; but if from any cause this be inexpedient, then by all means let there be a swinging front, and care taken that there be a sliding front capable of being both raised and depressed, for both are necessary.

We consider it necessary to say a word or two of caution to those of our readers who may be anxious to experiment with the "new artificial light" mentioned by Professor Stebbing in a communication in our last issue. The production of light by the combustion of peroxide of nitrogen charged with the vapour of bisulphide of carbon is not by any means new, and accidents of a rather serious nature have been reported from time to time. What, however, we wish to specially direct the attention of our readers to is the fact that the tube packed with iron turnings is not to be depended on as a preventive of explosion. The cooling effect of such a safety tube will certainly prevent the explosion of mixtures of gases to a certain extent; but we doubt much whether, with oxygen and hydrogen in their combining proportions, it ought to be relied on, as we know that several explosions have occurred through a Hemming's safety burner, which had quite as large a cooling surface. Some time ago, when experimenting with the light nearly as arranged in the laboratory of Professor Stebbing, the principal difference being that our tube was filled with tolerably-small shot, the result was a smart explosion.

PREPARATION OF PHOTOGRAPHIC DRY PLATES BY DAYLIGHT.

Some years ago, when dry-plate photography—at least, the tannin process—was comparatively new and consequently somewhat uncertain, a contribution upon that subject seemed never amiss in the columns of a photographic journal. In one of the numbers of The British Journal of Photography I called attention to the results of a prolonged series of experiments upon tannin plates, and I gave at least the main features of a method of preparation which I had been led to adopt, in which the inconveniences and unpleasant and unhealthy prolonged confinement in the dark room were avoided. Indeed nothing—not even the feeling of uncertainty as to results—contributed so much to render dry-plate photography uninviting as the apparently endless washings required in the preparation of the plates, often prolonging the operations far into the night when a large number was to be prepared.

A few amateurs, as far as I could learn, were curious enough to try the process suggested, and gave evidence in its favour, and perhaps it was introduced in the preparation of dry plates on a commercial scale; but, doubtless, its apparent conflict with what might almost be termed "photographic instincts" deterred many from even investing enough time and trouble to give it a trial, and prevented its general adoption and the inevitable improvements upon it that would have been found in the journals.

Having recently had occasion (or I should, perhaps, rather say, the leisure) to use some dry plates I returned to the old process, and found it just the same convenient, certain, clean process I had left it. About the same time I found in the columns of that excellent German photographic publication, the *Photographisches Archiv*, of March, 1874, a new dry process by Herr Krone, embodying a somewhat similar principle, and claiming a similar merit, which was to be employed in photographing the transit of Venus. Whilst the process is, however, so entirely different in its manipulation and details and in the solutions employed that the points of resemblance might be overlooked on a casual reading, there are several of its features that might, perhaps, be incorporated with the process before alluded to with decided advantage, and lead to such improvements as might render its applications more extended. The process, as before given by me, consists essentially in sensitising plates coated with *ordinary* negative collodion, containing *both iodides and bromides*, in an *ordinary* silver bath, in broad daylight—sunlight if it happened to fall upon the place of preparation—and then *removing* any *developable* effect of light before tanninising, performing this latter operation at any time, in the usual way, with the ordinary tannin solution of about fifteen grains to the ounce, in the dark of course, the plates being rendered sensitive to light by this operation.

The *removal* of the effect of light in the first instance is accomplished by simply washing the plates, or, rather, simply rinsing off the excess of nitrate of silver, as they come from the bath, and then flowing them with about a five-per-cent. solution of iodide of potassium, then washing off the excess of iodide, and allowing them to dry in the light, as they are entirely—at least, practically—insensitive to light after such treatment. Before tanninising, if the tannin solution be simply flowed backwards and forwards over them, they must be moistened with pure water, and the tannin should be allowed to act upon them somewhat longer than when they are prepared directly from the silver bath. Instead of a solution of iodide of potassium, one of any alkaline bromide or chloride will answer; or even simply prolonged exposure—say for more than an hour—to bright sunlight will have a similar effect.

The exposure required in the camera is about the same as that for ordinary tannin plates, the method of development being also the same; the results are more certain, and the negative cleaner. The great advantage of the process consists in the possible separation of the operations into two distinct portions, which can be conducted at different times, after, indeed, the lapse of any interval of time, and each part of the process can not only be conducted more comfortably and leisurely, but with greater freedom from liability to defects than when solutions of nitrate of silver and tannin are used at the same time. Besides, the plates brought to the first stage, being insensible to light, need not be stowed away with that great care for the exclusion of light which must be taken with the finished tannin plates; whilst the sensitising is, perhaps, the simplest part of the process, requiring but little time or apparatus.

Besides tannin, however, there are many other substances that will render the film sensitive; in fact, there are very many, and it is from experiments with such sensitising agents of different kinds that improvements may be reasonably expected in the process.

I have recently tried the effect of fuming with ammonia, as in the preparation of paper for printing, and found that it exerted a most decided sensitising effect; plates from a lot that gave no impression after the most prolonged exposure in the camera, and which, after tanninising, behaved in the usual way, were rendered, in some cases, even unusually sensitive to the image in the camera by exposing them to strong fumes of ammonia before exposure. As the effect seemed to be very variable in degree, in some cases being apparently wanting, different portions of the same plate were exposed for different lengths of time to the ammonia fumes by placing the plate over a box, as a cover for it, in which a capsule with strong ammonia was placed, and shielding some parts of the plate from the action of the fumes. In some cases the shielded parts received the most decided impression in the camera on development, and in other cases those parts longest exposed to the fumes. It seems, therefore, that there is a certain amount of fuming, perhaps between comparatively narrow limits, that will produce a maximum sensitising effect, and that above and below it there may may be points of apparently no effect. May it not be possible that with the selection of the best formula for collodion for this process, and a fuller investigation of the conditions necessary for the maximum effect of the ammonia, to replace the silver bath in field photography with a bottle of the so-called stronger ammonia?

In the article before alluded to a solution of nitrate of silver for flowing the plates, instead of a large dipping bath, was suggested, as nitrate of silver was found to be more decided in its sensitising effect than tannin. The process of Krone rests upon this action of nitrate of silver upon insensitive iodide and bromide of silver. His process, however, seems to start from the well-known fact that iodide or bromide of silver prepared in the presence of excess of alkaline iodide is insensitive to light; in other words, the action of light in the preparation of the plates is, as it were, *prevented* by forming the insensitive iodide, whilst in the other process it is effectually *removed*. He employs for the purpose what he names "silver collodion," which consists of a solution of gun-cotton containing nitrate of silver, to which from four to six drops of shellac-sandarac negative varnish are added for about every two and a-half fluid drachms of collodion. This collodion, he states, will keep for years, if protected from light, and is applied as usual, and without any preliminary coating. The plates coated with it are immersed in a bath of iodide of potassium, or, in some cases, of iodide and bromide of potassium, to which some of the "silver collodion" with the negative varnish in it has been added. They are then thoroughly rinsed in water, and immediately or after drying, as may be most convenient, are sensitised by immersing them in, or flowing them for about half-a-minute with, a solution of ninety-two and a-half grains of nitrate of silver to three and three-eighths fluid ounces of distilled water, with three drops of the iodide of potassium bath added. They are then thoroughly washed and dried. Herr Krone states that, as far as his experience goes, nitrate of silver forms the best sensitiser, and is disposed to attribute its action in this case in great part to some organic compound formed by it with the resinous matter introduced, and which may play a part in this process analogous to that of albuminate of silver in the albumen processes.

According to my own experience, however, he makes very minute statement of needless precautions when bromide of silver is employed with the iodide. That a direct or photo-chemical effect is produced by light upon bromide of silver, as well as a developable effect, is doubtless true; but it is of such a character and so slight that it practically may be entirely neglected, if, indeed, the subsequent operation of fixing do not remove it. Herr Krone suggests the use of an iodide bath alone in some cases, but admits that for landscapes a bath of mixed iodide and bromide is preferable. He states, however, that plates thus prepared must be protected from the light, even before sensitising. In my own work I have employed any ordinary bromo-iodised collodion, although the first experiments, by reason of the stress laid upon the direct action of light on the bromide of silver, were made with a specially-prepared collodion containing iodide alone. Doubtless, the organic matter introduced in this process, though very slight, may play some important part; but, on the whole, it is liable to the formidable objection that it does not permit the use of perhaps a single standard or usual photographic preparation or formula. C. F. Himes, Ph.D., *Prof.*

OUGHT THE STUDIO TO HAVE A GLASS ROOF?

The above question—and it is a very important one for every professional photographic portraitist to consider—has been suggested to me lately more forcibly than ever by the sight of a *carte de visite* of an old friend, taken a few weeks since by a professional photographer in the west of England, whose name and address are unblushingly printed on the back in ornamental characters of green and gold. My old friend is one of thirty years' standing; in fact, the very man who tied my nuptial knot, who himself quickly followed the example, is now the happy father of a progeny of nine, and the husband of a third wife. Well, thirty years ago we were *arcades ambo*, and "his locks were like the raven" and "his bonny brow was brent;" but now, judging by his photograph, "he is growing auld, and his locks are white as snaw." But what a libel upon my dear friend! What a miserable perversion of the truth! Time and the cares of life have, no doubt, written a wrinkle or two upon his manly brow, but his hair is still as black as the raven's wing, without a grey one amongst it; and as for baldness and snow there is not a hint of such things yet. Why, then, has photography done him such gross injustice? The answer is perfectly simple and self-evident. The studio in which he sat for his portrait had a glass roof, and the light full from the zenith was allowed to fall upon his crown. What an intolerable blunder! What a hideous mistake! Let us, then, all set to work and discuss seriously whether our studios ought to have a glass roof at all; for nearly every studio has one, and a great many photographic portraits that one sees have too much light on the top of the head, suggestive of a "frosty pow." That a glass roof to the studio is not *necessary* I have the proof now before me in a beautiful daguerreotype taken many years ago in a room with two common windows of the ordinary size. The lighting of this portrait is nothing short of perfection; and yet the plate was less sensitive than our modern collodionised plates. Moreover, the room in which it was taken was not that of an amateur, but of a professional, photographer, who had worked in it successfully for several years, and whose work was up to the highest standard of excellence at that time, or since.

Let us, then, discuss this question calmly and rationally. Ought the photographic portrait studio to have a glass roof? or will it be sufficient to light the sitter entirely by a side window aided by a reflector, and will this lead in general to a better result?

What are the real or supposed advantages of a glass roof? The answer appears to be that it lets in more light; that in a gloomy, smoky English town—particularly at this season—the photographer wants all the light he can get; and even then, with a studio *all glass*, he has often scarcely light enough for taking a portrait with a reasonable length of exposure. On the other hand, during the summer, and when the light is good, he can cut off all unnecessary light by means of curtains properly arranged. In fact, with a studio all glass, and a proper management of curtains and reflectors, he can do just what he likes with his light.

All this appears sensible enough; but there is another side to the argument. Even in England the Sun shines sometimes, and it is generally admitted that when he does shine upon a glass house he makes it uncomfortably hot, particularly when it is small. Besides which, we all know that in cold weather a glass house is likely to be a very cold one, unless the glass is so thick as to stop many of the actinic rays. There can be no doubt that a glass studio is subject to great extremes of heat and cold. Then, again: however well arranged the curtains may be, the Sun will sometimes find his way through an unlucky chink, and give a great deal of trouble to dodge him. The curtained glass studio is like a leaky ship, requiring the constant watchfulness of the caulker, lest a stray beam should struggle through some gap and gild the nose of the sitter. And, lastly, we have to inquire of what use is the glass right over the head of the sitter, and behind his back? Does it really matter whether any part of him which is not exposed to the lens be lighted or not? And is it good under any circumstances to light up the crown of his head? The answer to these questions will, at any rate, decide how far the glass roof and sides ought to be carried, and whether they ought to extend a single inch *behind* the sitter. Let us never forget, in building a studio, that the more glass there is the hotter the room will be in summer and the colder in winter; the more glare there will be in it to fatigue the eyes of the sitter; and the more diffused light to illuminate the dust and smoke in the atmosphere, and dim the brightness of the image upon the sensitive plate. It may be held as an axiom that there should be no more light in the studio than is necessary to properly illuminate the sitter; that the photographer with his camera should be almost in the dark; and that the eyes of the sitter should be directed into darkness, so that the pupils may expand, and no discomfort be experienced by blinking steadily for several seconds at the light. Expression will depend greatly upon this; for it is not a momentary gleam of intelligence which photography can arrest at present upon the plate, but a sustained expression, which, to be pleasing, must be based upon agreeable sensations during a sitting which may last for twenty seconds.

It has been said by those who approve of a studio all glass that the photographer cannot imitate the painter, because he requires more light. There may be some truth in this so long as we work by our present methods; but, on the other hand, we must remember that a painter labours under this disadvantage, viz., that he not only requires to light his sitter but also the canvas upon which he paints; whereas the photographer with his camera can be almost in the dark.

There is also another point to consider in connection with this subject. It is not the face of the sitter which in general requires so much light; it is the dress, which in many cases is dark, if not absolutely black. Now, may it not be possible, by means of a mirror, to throw reflected light upon the dress only whilst the face is being exposed, and thus sacrifice neither to the other, but work in a nice, cool, dark studio, such as a painter would prefer, and produce results which would be perfect in their modelling and gradation without the aid of a retoucher?

These are no new crotchets of my own which I am now suggesting to the reader for his consideration. I am well aware that to many these ideas are not only no novelty but such as they have acted on with success in their daily practice for years past; but I am anxious that they should become more prevalent, and that, if the principles advocated are right, they should be generally admitted and acted on by the profession at large. THOMAS SUTTON, B.A.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The introduction of a new portrait lens with a cemented back combination, such as that recently described as having been patented by Messrs. Steinheil, will be looked upon with interest. The first thing that strikes one is the fact of the front lens being larger than the back. In this respect there is no novelty, for it is similar to one of the earliest forms of quick portrait lenses ever made (one by Voigtlander), which is now out of use, but which had a front lens of larger dimensions than the back, in the proportion of three and a-quarter inches to two and three-quarter inches. Lenses, as well as history, thus repeat themselves. But the old Voigtlander lens possessed another feature in common with the new arrival—its back lens was a cemented compound. Here all resemblance between the two ceases. The whole four of the external surfaces of the old lens were convex—some of them much more so than others, of course; the lenses of the new combination are shallow menisci. Each lens in the old objective was composed of three elementary portions; no portrait lens at the present time contains more than two. If denser glass were used in the construction of lenses of the rapid rectilinear type they could doubtless be made with a larger aperture than they now have—large enough, one might imagine, to permit them to be employed in portraiture; but whether it would be advisable to use glass of such a degree of density in a climate like ours, which produces injurious effects upon certain kinds of glass, is a different question.

Another technical exhibition has come and gone. These exhibitions would be much more useful than they are if the trade element—objectionable under other circumstances—were more freely introduced. What I mean is this:—Many manufacturers and dealers may frequently possess articles of great value, interest, and novelty, the nature or even the name of which is unknown save in advertisements. It would be a valuable boon to photographers, especially to those from the provinces, if an opportunity were afforded them once a year to examine such a collection; and to this end, the managers of such a technical exhibition might send a special invitation to opticians, chemists, camera-makers, and dealers to exhibit any novelties they might possess. Such a display would be useful both to the producer and the consumer.

I observe that a new society—the West Riding of Yorkshire Photographic Society—has been formed in Bradford under the able secretarial management of Mr. J. W. Gough. From all accounts the field there is quite ripe for such a society, and I trust it will be well supported and have a long period of future prosperity.

The making of combination groups by what has been termed the "American process," as described at the technical meeting of the late South London Photographic Society by Mr. B. J. Edwards, does not, I think, owe its origin to our transatlantic brethren, however well and skilfully it may have been carried out in America and Canada—notably so by Messrs. Notman and Inglis, of Montreal. If I remember aright the first large work of this kind successfully carried out was a picture the precise name of which I am uncertain, but it represented "the genius and talent of Great Britain," and was made by Mr. Brothers, of Manchester. The heads and as much of the bodies as possible were printed and arranged on a sheet of cardboard, and the figures and accessories completed by an artist in monochrome, a negative being then taken from which the photographs were subsequently produced.

The news that the French have at last got hold of a process for producing photographs in natural colours must, I suspect, be received with much caution. From the advent of the late Rev. Levi Hill, of America, who *said* that he had solved the problem of producing photographs in natural colours, down to the present time very much has been said and written on heliochromy. Matter-of-fact men will suspend all judgment till they see results. Let me not be misunderstood. I am quite aware that the possibility of producing photographs in colours has been demonstrated beyond all doubt, but only by processes replete with difficulties and commercially impracticable.

When reading the disputed case of Hayling *v.* Hyde, I came to the conclusion that the paste had nothing at all to do with the fading of the photographs about which the dispute arose. An expert ought to have been employed to test whether any antichlor had been allowed to remain in the mounting-board. The amount of hyposulphite of soda present in some cardboards is surprisingly large.

Now that the subject of the establishment of a British Photographic Congress has been formally brought before a photographic society it would be well to learn how the idea is likely to be received by the photographic public. The British Association does not fulfil the hopes that some photographers were wont to cherish in connection with that body, and it is looked at very coldly by photographers, who appear to hold studiously aloof from the association, which certainly appears to have no sympathy with photography; hence the importance of having such a Congress established as that advocated by Mr. Jabez Hughes. The appointed place of meeting might either be that selected for the meeting of the British Association or not; but if it were it should be held three or four days prior to the meeting of the older body, in order to avoid the extortionate charges for accommodation made to scientists during the week when science "holds high revelry."

ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

VII.—WEIGHING AND MEASURING.

As upon the power of determining the weight of any substance with rigorous exactitude depends the whole foundation of theoretical chemistry, while it is of equal importance in the everyday practical work of the laboratory, the earnest student will spare no pains, even in the simplest operation, of obtaining that care and precision in performing the acts of weighing and measuring which, if he advance in his studies, he will find of the utmost aid.

With regard to the instrument itself to be used, care, neatness, and cleanliness—the importance of which in all things I endeavoured at the outset to impress upon the student—must be carried out to the fullest extent, whether the implement employed be a pair of scales costing a few shillings or a chemical balance worth as many pounds. The latter being a necessity in a well-fitted laboratory and, under most circumstances, likely to come under the student's notice, even in the more elementary stage of study for which these chapters are more especially meant, it will not be out of place to give some information respecting it. It can be purchased of various degrees of delicacy, indicating from the fiftieth of a grain to the five-thousandth, the cost varying in as great a degree, one which will show the fiftieth of a grain being procurable for under two pounds, while the more delicate one would cost as many score.

The balance, which is kept under a glass shade, consists essentially of a pillar supporting a metal beam suspended in its middle by a delicate pivot, and having at each end a pivot from which is hung a pan for holding the weights and the substance to be weighed. Its greater or less delicacy is governed by the length of the beam (which ordinarily varies from about eight to twenty inches), its lightness, the delicacy of the pivots, and their careful adjustment. These latter have knife edges of steel or agate working upon agate, and all instruments are provided with an arrangement by which the beam is removable from the knife edge when not in use. In the better-class ones there is also a frame which bears the pan supports, removing them from contact with their knife edges. The highest class of instruments, too, possess an arrangement for steadying the pans, rendering them free from oscillation when the beam is raised. The index of the chemical balance, unlike that of commercial scales, points downwards instead of upwards, and immediately behind its point is an ivory scale showing fractions of an inch, the middle being the zero, and the numbers starting right and left from it. In the better balances the beam is graduated with decimal divisions to avoid the use of small weights on the pan, a little platinum "rider" being used, which, according to its position on the beam, will represent any value from ·1 to ·9 of its own weight. In the more delicate instruments this also can be moved and adjusted from the outside of the glass case.

The chief characteristics of a good instrument are—constancy in its indications, delicacy and rapidity in its action, and similarity of indication when the object and the weights are changed about from pan to pan (showing that both arms of the beam are of the same length). This is a most important point. With a defective instrument the same object will weigh very differently at different weighings; but in the best class some *little* difference must be expected. If it be suspected that the arms are of unequal length the truth can easily be ascertained by accurately counterpoising a substance placed in one pan by weights, or a further portion of the same substance in the opposite pan, and then reversing the contents. If the balance still remain in equilibrium the beam arms are equal; if, however, the substance do not counterpoise under the changed conditions the arms are unequal, and the true, or "absolute," weight cannot be given direct. Absolute weight, however, is not often needed, comparative weight being only called for in analyses. To give an instance: a balance gives a reading of one-tenth too much, and it is required with it to give the proportion of solid contents in a fluid—say, iodising solution. The fluid in the balance weighs 500 grains; the residue, after evaporation, ten grains; the required proportion is $\frac{10}{500}$, or one in fifty. The true weight of the solution is 450 grains, and of the residue nine grains; but $\frac{9}{450}$ is still one in fifty. It will, of course, be obvious that the same balance, when the beam is unequal, must be used for all weighings in one operation.

But, even with the uneven beam, the absolute weight can be obtained by "double weighing." This consists in carefully counterpoising the substance with some other body—sand, for instance; then taking it out of the pan and substituting weights to balance the sand, &c., used in the opposite pan. These weights give the *absolute* value of the substance.

The balance should be accurately levelled and its place determined once and for all; repeated removals subject its adjustment to much risk. It should be carefully dusted before use with a camel's-hair brush, and it should be ascertained whether it be in equilibrium or not; if not, a sweep of the brush across one pan may make it so. A most careful analyst once made an important error through a fly having settled, unobserved, on the beam. Errors have occurred, also, through a rider having been accidentally left somewhere on the beam. It is not necessary to clean the balance too often, as the adjusting is an operation requiring great care. Once every three or four months an hour or two spent in cleaning will be quite enough, if care have been taken meanwhile. To preserve it from damp a vessel containing lime or chloride of calcium should always be placed within the glass case, and the utmost care should be taken to keep it free from corrosive vapours. Hence will be seen the desirability of keeping it in a separate room. When a crucible and its contents which have been subjected to ignition are to be weighed they must be cooled first, or they would produce currents of air which would prevent any accuracy being obtained. If the substance be one liable to absorb moisture the cooling must be quickly done by placing it on a cold piece of metal—a large iron weight, for instance. Deliquescent substances may, if the further operations will allow it, be dissolved with advantage in a weighed quantity of water, and the increase of weight noted.

The usual grain weights are 1,000, 600, 300, 200, 100, 60, 30, 20, 10, and the smaller grain weights in the same proportion. They are, to save the weigher's time, usually put in the right-hand pan (though in assaying the reverse is done), and the pans should always be at rest when anything is put upon them. In taking the weight of a substance the weights should be tried in consecutive order, beginning at 1,000, and adding the next higher, or replacing it by the next lower, and so on with the lesser weights, and finally the rider, till an accurate counterpoise is obtained. As the lighter weights become needed the rapidity of oscillation of the beam and the position of the index, if its range do not extend over the whole arc, will soon be a guide to the careful and observant experimentalist. In adjusting the weight when using a very sensitive balance it would be too tedious to wait for the oscillations to cease; the motion of the index should be noted. When it points to the same number on each side of zero in its excursions the counterpoising may be considered complete, and the weights may be counted up. It is very necessary to say that the utmost care must be taken in counting up the weights; in nothing is error so liable to creep in. They should first be counted in the pan, then taken out, placed in order, and re-counted, or the weights not used may be counted, and a subtraction made. Every care must be taken in handling them, which should be done with a pair of forceps, often of ivory, supplied for the purpose. If dusty they should be wiped with a soft brush or silk handkerchief, and the small platinum ones may be occasionally exposed for a moment to the flame of a spirit lamp if necessary. Whatever weights are used, and by whom made, they should be examined when first purchased, also periodically afterwards, to test their accuracy; this will also serve as practice for the student. It may here be noted that the smaller the load the more sensitive the balance. I cannot more appropriately conclude my remarks on the balance than by quoting Faraday, who says:—"Many conclusions, tending to subvert most important chemical truths, might be quoted as having arisen solely from errors in weights and balances."

For the rough work of the laboratory and for general dark-room work, where a difference of half-a-grain or a grain is of no importance, the ordinary apothecaries' scale will be made use of. These are of two kinds—one to be suspended from an upright pillar, and the other from the hand, during the operation of weighing. For general use the latter is much to be preferred, as being the speediest for working and most easily put away when done with. Many who do not possess a chemical balance have one of each of these instruments, keeping the one to be used with pillar or standard as a balance for analytical purposes when excessive delicacy is not required. The hand scales are very useful, and great care should be taken to keep them clean and in order. They can be purchased from about half-a-crown upwards, but the cheaper ones with simple hook ends are comparatively useless. The pair provided should have "box ends," as it is termed—that is, the pans suspended with a knife-edge arrangement working in a small metallic case or "box" at the end of the beam.

The pans are made in metal, ivory, mother-of-pearl, or glass—the latter, though less neat-looking and rather heavy, being preferable on account of the ease with which they can be cleaned and the readiness with which any substance adhering to them will be seen. If they get broken, too, new ones with holes ready pierced can be bought. In course of time the silk cords get worn and dirty; they, also, can be replaced with ease, being easily purchasable ready for attaching to the ring that connects them with the beam. In attaching a fresh set, or the cords for one side only, if through accident it should be required, notice must be taken whether they equipoise; if they do not, a little fine silk may be wrapped round the upper part where the three strands join, when the neatness of the whole will not be interfered with. The working parts—the box in the middle and ends of the beam—should be carefully wiped and cleaned periodically; it is quickly done and ensures accuracy. The pans should be wiped both before and after using, and, when finished with, should at once be put away and not left lying on the table to get splashed and corroded.

To use these scales they should be held by the little tassel between the thumb and forefinger, the second and third fingers just touching the upright (in which the index swings) to give it steadiness. Gently raising them about half an inch from the table, the pans, which, when freed, will swing about, may be steadied by lowering them till they just touch the table. After raising and lowering again—notice having been taken that they hang freely and equipoise properly—they will be in position to receive the weights and the object to be weighed, the latter being put in the *right hand* pan, the pans just resting on the table to prevent oscillation. Instead of shaking the contents from a bottle on to the scale pan the better plan is to take them out with a glass spatula, or, in the absence of that, a stout piece of cardboard. The fingers should never be used to remove any excess placed in the pan; the spatula or card should be used for that purpose also. Mistakes very frequently occur through the pan cords catching on the end of the beam when taken out of the box. This, when not observed and rectified, may lead to great error. The weights, too, should be carefully examined and noted, and, of course, tested against one another before being put in use. Grain weights supplied with these scales are generally small square pieces of brass marked by as many small circular indentations as they weigh grains, instead of with numbers; but some, which have been verified, have likewise one punch-mark to that effect, which is not to be confounded with the other numerical markings.

In most chemical works, English and continental, the metrical system of weights is adopted, and with these the student should make himself so familiar as instantly to grasp mentally the value of any weight or measure as soon as seen or heard. The metre is the unit of linear measure and of the whole system, and is equivalent to about a yard and one-twelfth English. The tenth part of a metre is a decimetre, and a cubical space which measures exactly a decimetre each way is the unit of capacity, and is called a "litre;" it is about a pint and three-quarters. The hundredth part of a metre is a centimetre. A quantity of water which would exactly fill a cubical space a centimetre each way is the unit of *weight*, and is called a "gramme;" it is equal to nearly fifteen and a-half grains English. The names of the various weights and measures higher or lower than these units are the same as the unit with the addition of the prefixes "deci," "centi," "milli," to represent a tenth, a hundredth, and a thousandth part of the unit, and of "deca," "hecto," "kilo.," to indicate ten, one hundred, and one thousand times as much. Thus, a gramme is equal to 15·43 grains English, a centigramme to ·15 grains, a kilogramme to 15,432 grains. From Messrs. De la Rue's tables I give the following exact equivalents of English and French values:—

A metre = 39·37079 inches.

A litre or cubic decimetre = 61·02705 cubic inches = 35¼ fluid ounces.

A gramme or cubic centimetre of water = 15·4323487 grains.

All the other denominations—higher or lower—are obtained by shifting the decimal to the right or left—a plan the rapidity and simplicity of which commends itself at once. It will be seen from what has gone before that a cubic centimetre will be equal to a millilitre. In practice the latter denomination is little applied—"litre," "kilogramme," "gramme," and "centimetre" being the most generally-used terms, the two former being synonymous in the case of water. The value in French weights is as follows:—

One inch = 2·539954 centimetres.
One cubic inch = 16·386176 cubic centimetres.
One pint = ·56794 litre.
One pound = ·453593 kilogramme.
One ounce troy = 31·103496 grammes.

G. Watmough Webster, F.C.S.

FADING.

I have just read the interesting article on *Fading* in the last number of The British Journal of Photography. From my experience in photography, extending over many years, I am convinced that one great and unsuspected cause of fading is over-washing. It is no unusual thing with many photographers to allow the washing of their prints to extend over twenty-four hours or longer, under the impression that they are thereby ensuring the removal of every trace of hyposulphite of soda. It is quite possible the hypo. may be removed; but the prolonged soaking in water seems to introduce some mysterious elements of disease, or sets up some kind of decomposition which, under conditions favourable to its development, causes the future decay of the print, but in the absence of such conditions the disease may remain latent and undeveloped for years.

I have often heard photographers complain, especially in warm weather, that a batch of prints, when mounted, have turned out quite useless owing to symptoms of fading. The fact is the prints have been washed to within an inch of their lives, and merely require the extra amount of moisture supplied by the operation of mounting to cause them to fade.

I believe that developed prints on iodised paper are more susceptible to impervious influences, and are more liable to fade, than any other kind of photograph. If such a print be left soaking in water all night in hot weather it will most likely have disappeared by the morning, leaving nothing but a sheet of white paper, or, perhaps, showing only a few yellow marks where the deepest shadows have been. The same result will take place with a print on albumenised paper, but will require a longer time, owing, I believe, to the protective influence of the albumen, and also to the fact that there is more silver reduced in it than in the developed print.

The only remedy for such a state of things, and the one I have always adopted, is to get through the washing as quickly as possible. All prints should be washed by hand, changing the water as often as possible, squeezing and pressing the mass of prints with a sponge between each change. One or two hours of such treatment is worth far more than washing and soaking for a day or more in the usual manner. When the prints are washed quickly a margin is left for any ill effects likely to arise from the extra moisture caused by mounting or after-exposure to damp.

In winter and during cold weather most persons are in the habit of warming their solutions. I think this practice may be carried too far—as in some establishments where I have noticed that the toning and fixing solutions have been kept smoking hot over a gas jet. It is not unreasonable to suppose that, under such conditions of excessive heat, some unsuspected and obscure form of decomposition may be set up or introduced into the prints, causing them ultimately to fade, which might not possibly be the case if the solutions had been used at their natural temperatures or with just the chill off. Moreover, I have always noticed that where photographic operations are forced the results are inferior; of course the chief reason for making the solutions so hot is to save time.

I think it will be admitted that the mere removal of hypo. is not the only thing to be considered, as every photographer must have had experience of the fact that waste prints which have scarcely been washed at all have lasted when others produced with every care and attention have faded.

I will conclude with a curious fact I have noticed in connection with developed prints, namely, that when quite faded they may be restored by pouring over them the gallic acid developer with a few drops of silver. After fixing and washing and allowing to fade they may again be restored by the application of the developer. These operations can be repeated several times. I am aware there is nothing new in this, as the same thing was observed years ago with paper negatives. I think, however, the fact shows that the picture has not flown, but that the silver forming it is somehow altered. Why should it not be the same with albumenised prints? The fading may only be apparent, and may simply require the application of some reducing agent to restore them to their original beauty.

If the theory of silver printing could only be properly understood there might be no reason why prints produced by its means should not be permanent. COMET.

COMFORT AS NECESSARY TO GOOD WORK.

WE have had from time to time small essays on photographic hygiene. I will take an additional step, and endeavour to show that a necessary condition for the production of high-class photographic work is the hygiene produced by the thorough comfort of those engaged in it. I doubt not this idea will be "pooh-poohed" in many quarters, and the idea of an *employé* at a small salary requiring comfort in addition voted absurd. "He has never been used to it, so he cannot miss it," is a shallow argument which I will endeavour plainly to disprove—not by advocating Turkey carpets, ormolu fixings, or velvet-covered lounges—comforts that merely gratify an æsthetic sense rather than prove a practical good, although, at the same time, a state of bodily comfort is most undeniably necessary for the production of luxuries that are dependent on skilful manipulations, judgment, and taste; and what can be more dependent on these conditions than photography?

If we see an *employé's* nose blue and his fingers red we may safely conclude that comfort is an unconsidered trifle at that establishment, and loss from breakage and waste no unimportant item in the yearly outgoings. Comfort, moreover, means another thing—it means good health; and discomfort, in the shape of excessive heat, excessive cold, or multitudinous draughts, means bad health—chiefly headaches, stomach complaints, and rheumatism. When one member of the body suffers the whole of the human machinery is more or less impeded in performing its proper functions; consequently the same skill and thought cannot possibly be applied and exercised under such deranged conditions as if they were working in a normal and healthy state. This rule applies to nineteen out of twenty who are daily employed in ministering to the requirements of an exacting public. Here and there may be an individual so blessed with vital energy that all the discomforts and privations he may undergo make no more impression on him than the proverbial water on a duck's back; these are, however, few.

It is an acknowledged fact that persons, both male and female, who are possessed of highly-wrought sensibilities and delicate organisms have frequently more ingenuity and good taste than those of a more robust character, and these qualities are especially necessary to those engaged in the photographic profession. Such persons are more readily affected by the conditions of comfort or discomfort under which they pursue their daily avocations. I am inclined to think that many of the wobegone, cadaverous physiognomies belonging to those employed by photographers are thoughtlessly attributed to drink or dissipation, when the real cause is perpetual work in places destitute of comfort, and, consequently, inimical to health. Following out the idea, indifferent health begets slovenliness and carelessness of habit, together with ill temper; in fact, the moral man is so intimately mixed and influenced by the material man that employers of labour would not only increase their own profits, but improve the quality of their productions, by due and careful attention to the comfort and bodily wellbeing of those in their employ. It is an unpleasant fact to know that in the profession of photography so many out of the thousands of printers and operators are worthless and untrustworthy, taking advantage of, and robbing, their employers whenever they have the opportunity. I once heard an operator exclaim on taking a new situation, "I never heard of a *religious* photographer before!" His experience of men and things had not fallen in—well, let us say *respectable* places, as in the way "religious" was emphasised it was undoubtedly intended as a generic term for honour and respectability.

A great deal has been said about raising the status of photography and photographers' education, and much besides; but I think the most effectual *argumentum ad hominem* is proper care for the comfort and wellbeing of those employed (the rest will follow *en suite*), instead of the common and most reprehensible method of getting as much out of the human machine for their money as they possibly can, giving as little in return as their superior position and sharp practice enable them to do. Under these circumstances a man or woman rather weak in moral development will have all his or her bad qualities and cunning brought out and the good qualities gradually obliterated, eventuating in the man getting very misty ideas of the difference between *meum* and *tuum*—so much so that the "*tuum*" fades away altogether and the "*meum*" is the all-absorbing remainder. Then the chances are he gets sent adrift without a character, or, at least, a good one; possibly he turns up at a police court. The master flings the "vile-scoundrel" epithets freely after him, and, like the dog with a bad name, he wanders from studio to studio, gets a week or two of employment now and again in the pressure of the season, and in the winter time picks up an inadequate subsistence where and how he can—in fact, lives on his wits.

I noticed, in a recent issue of the Journal, an allusion to the fact of assistants receiving and masters paying less for the winter months than for the summer, and I quite agree with the writer that in a *general* way it would bring money into the employers' pockets to keep the same staff all the year round, winter and summer, providing they are up to their work. A successful employer of labour once told me he "would not give a 'thank you' for a man that could not put two days' work into one or one day's work into two." He was right, for I believe that, where a large increase of staff takes place in the season and its members turned adrift in the winter, the management is at fault, as it will be found that, when the extra hands (often considered nothing else) are employed, few do their best; there is, consequently, waste of labour. Suppose, for instance, four people are employed at the same work in the winter, and two extras are taken on for the summer season, the employer would be more in pocket if he kept five all the year round; besides, the additional advantage of reciprocity and harmony increasing between employers and employed (providing the employer cares anything for the welfare of those he engages) evolves, as it were, their good qualities in the anxiousness of those employed to do their best, harmonises the whole establishment, and each one identifies himself with his business, and feels that his employer's credit is his own. With such conditions it is evident the best work will be the result.

Neither is this state of affairs an utopian one, as more than one firm in a flourishing condition can testify. I have now lived for a few years in the manufacturing districts of the North of England, and it seems to me that there is *generally* no such thing as harmony between employers and employed. The paymasters try to get as much work for their money as they can, caring for nothing else, and the employed to give as little; in fact, they look on each other as if their interests were diametrically opposed, instead of being identical. This feeling, I am afraid, prevails too much throughout the length and breadth of the land—the larger industries more or less influencing the smaller, although connected in no way with each other. As far as photographers are concerned the comparatively few engaged at each establishment renders it more easy, as well as more necessary, that this kind of feeling should not exist among them; and their motto should be "unity." E. DUNMORE.

FOREIGN NOTES AND NEWS.

M. GEYMET'S EXPERIMENTS IN HELIOCHROMY WITH BROMIDE OF SILVER.—PHOTOGRAPHIC SOCIETY OF FRANCE, LAST MEETING.

M. GEYMET—a gentleman with whose name in connection with photo-enamels, photolithography, and other photographic novelties our readers must be by this time perfectly familiar—has just published a long letter in the *Moniteur*, in which he takes upon himself all the responsibility of the singular experiments to which we alluded a fortnight since in these *Notes* relating to photography in natural colours. He describes minutely how he obtained his results, and adds a few words of theory, which seem to support the conclusions at which he has arrived; in fact, the whole story he has to tell us will put a strain upon the powers of belief of some people, so marvellous will it appear to them, and so opposed to all their own former experience. But "seeing is believing;" and when we shall all be able to repeat the experiments described by our author, and with the same surprising results, we shall, no doubt, be willing to place M. Geymet on the same lofty pedestal with the other great discoverers in heliochromy—Becquerel and Niepce de St. Victor—whose researches in this direction have made so much talk in France. We may even be inclined to place him on a higher level, and do him all the honour which he deserves. Meantime we must be permitted to assume, like Prussia during the Crimean war, an "attitude of expectancy."

To cut a long story short, this is what M. Geymet asserts that he has done, and who can be so impolite as to disbelieve it? He has taken three negatives of a coloured object—one with a green glass before the lens, another with a violet glass, and another with a yellow glass. These negatives, he tells us, yielded prints upon albumenised paper which were identical in colour, and only differed slightly in the rendering of the half-tones. To an inexperienced or not very critical eye the prints were so much alike that they would appear to have been taken from the same negative; besides, the three negatives themselves presented no difference in colour, and were like ordinary negatives. But under this apparent resemblance, we are told, lay concealed a vast difference in the texture of the image, or the molecular arrangement of the atoms of silver composing it. For, when a print from each negative was taken upon a dry bromide plate, that negative which had the green glass before it gave a red print; and, similarly, the other two gave prints in the colours which were complementary to that of the glass behind which the negatives were taken. M. Geymet, therefore, asserts that M. Becquerel was wrong when he said, on the faith of his own experiments, that the violet sub-chloride of silver is the *only* body capable of being impressed by the different coloured rays of the spectrum, and of retaining the impression of the colours. According to M. Geymet, *bromide* of silver possesses the same property, whilst the colours impressed upon it do not fade away. This being the case, the wonder is that those who have for years past been taking negatives of coloured objects upon bromide of silver films have never yet noticed this peculiarity. That, perhaps, is a pleasure in store for those who persevere with the bromide process, where the film is excited in a nitrate bath—a process which, in the eyes of some people, has many attractions and a splendid future before it.

M. Geymet printed his coloured proofs upon dry bromised plates by contact with the negatives, the exact process employed being as follows:—The collodion contained bromide of cadmium only, and no iodide, in the proportion of one and a-half per cent. The nitrate bath, which must be strongly acidified, was eighty grains to the ounce, and the plate was left in it eight minutes. The film then looked as creamy as an iodised one. It was then washed, and had a preservative of beer and tannin applied to it. After the superposition of the negative upon the dry film, and its exposure to light (white light, so far as we can understand), the image was developed by the following mixture:—

Water	1,000	grammes,
Pyrogallic acid	10	,,
Acetic acid	5	,,

to which were added a few drops of a thirty-grain solution of nitrate of silver.

The print now came out of a colour complementary to that of the glass behind which the negative was taken. It was fixed with cyanide of potassium, strength six per cent., which caused the coloured image almost entirely to disappear; but, happily, the colour gradually returned, and became stronger when the plate was exposed to the sun's rays.

Such results are certainly very surprising; and if the account of them may only provoke the merriment of some readers, we feel persuaded that others will be induced to repeat the experiments, and that, in consequence, "*something* will take place," though we dare not venture to predict—like King Cole's astrologer—"what that something may be."

According to M. Geymet, pure hydrofluoric acid materially aids the formation of coloured images upon the violet sub-chloride of silver, though we are not told very clearly in what manner the acid is applied.

At the last meeting of the Photographic Society of France M. G. Noel—a chemist connected with one of the hospitals in Paris—made a communication in which he stated that the use of methylic alcohol in the iron developer greatly reduced the time of exposure and increased the density of the negative. He gave the following formula for its use:—

Water	300	grammes.
Ammoniacal sulphate of iron	15	,,
Acetic acid	8	,,
Methylic alcohol	15	,,

He finds it also advantageous to add a little methylic alcohol to the pyrogallic acid for strengthening negatives.

At the same meeting Dr. Van Monckhoven presented the members with a number of bottles of highly-concentrated solution of protosulphate of iron with acetic acid. It was stated that on adding a little of this strong solution to the ordinary developer greater density and detail were gained, so as to reduce the time of exposure.

Some remarks having been made by certain members on the subject of an artificial light from bisulphide of carbon and binoxide of nitrogen, M. Peligot, of the Institute, who was in the chair, warned the gentlemen present against the use of such dangerously-explosive compounds, and related an anecdote of Liebig, who had once, in the course of a chemical lecture, had an accident of this kind, by which the Crown Prince of Prussia, who was one of the audience, was wounded.

M. Lampûe exhibited several proofs of large dimensions, taken direct with one of Darlot's lenses; and M. Fleury-Hermagis exhibited a series of his new wide-angle and aplanatic objectives. The "reflectoscope" of M. Tenac was also exhibited in operation. (*Vide* our last week's *Notes*.)

THE PRACTICE OF PHOTOGRAPHY IN AMERICA.*

JOSLIN AND PHILLIPS, *Danville, Ill.*—We were somewhat surprised at your wishing to have our formula for publication in the *Bulletin*, as there are so many, perhaps, ahead of our simple formulæ and modes of working. We say "simple," for they are simple and easy to work. Formulæ do not advance photography; it is understanding how to work them. We will now give you our formulæ and modes of working. Cleanliness is in a measure the secret of good work. Keep everything about the studio clean. The dark room should be the cleanest room in the gallery. Wash the hands frequently. Watch the chemicals and baths and keep them in good order. Be sure you keep ahead of your work. We albumenise our glass. Collodion No. 1: bromide of cadmium, two grains to the ounce; iodide of cadmium, one and a-half grain to the ounce; iodide of ammonium, one grain to the ounce; Anthony's snowy cotton, four to six grains; ether and alcohol, equal parts. Collodion No. 2: iodide of potassium, two grains to the ounce; iodide of ammonium, one grain to the ounce; iodide of cadmium, four and a-half grains to the ounce; bromide of cadmium, two grains to the ounce; Anthony's snowy cotton, four to six grains. Bath: forty to forty-five grains to the ounce. Iodise by coating the glass with collodion, leaving it in the bath a short time. Acidify with C. P. nitric acid. Developer: iron, one ounce; water, sixteen ounces; acetic acid, one and a-half to two ounces. Do not use alcohol as long as the plates flow smoothly. Redeveloper: equal portions of acetic acid and silver bath. After developing the plate, and before washing, flow with this redeveloper. Flow the second time with iron developer, and then wash. Keep the plate in motion to prevent stains and streaks. By this mode you secure all the intensity you need for printing. Fix in hypo. Use Anthony's flint varnish for varnishing negatives. Make your negatives good, and do not rely too much upon your retoucher. Paper bath: use Anthony's alum bath. We use Morgan's double albumenised paper. Float from one to minutes. When thoroughly dry fume ten to fifteen minutes. Toning bath: water, two ounces; saturated solution of sal soda, sufficient to make the water feel slippery; salt, sixty grains; gold, enough to tone. Better effects will be produced by toning slowly. Fixing bath: hypo., two ounces; water, thirty ounces. Before toning the prints, wash in two waters. Take two gallons of water, half-an-ounce of acetic acid No. 8, and soak for ten to fifteen minutes in this solution. Then wash through three waters and tone. When your prints are fixed wash in running water three hours. We consider buff cards the best. Mount with starch paste made fresh every time.

Daniel Bendann, Baltimore.—In response to your request for my formulæ, mode of working, and use of means in making my pictures on exhibition in Chicago I cheerfully comply, premising that I have nothing new to impart, and that I place more stress upon cleanliness and proper arrangement of light than upon chemical excellence. I believe in simplicity, and I try to avoid humbug and sensationalism in pictures. I endeavour to reproduce nature at its best, or, to use a homely phrase, with its "best foot foremost." I retouch but little, and do not depend upon it at all. Five minutes is the average time required for retouching an "imperial" *carte*—oftener less than more. I do not permit my negatives to be touched by any substance whatever to give them a "tooth" for retouching, not finding it necessary. Collodion No. 1: ether and alcohol, equal quantities; iodide of ammonium, five grains; bromide of potassium, two and a-half-grains. Collodion No. 2: ether and alcohol, equal parts; iodide of cadmium, five grains; bromide of cadmium, two and a-half grains; Anthony's negative cotton and Anthony's snowy cotton, two-thirds of the former to one-third of the latter, sufficient to give proper consistency. I add from one-fourth to one-half of No. 2 to No. 1, according to my light, subject, and style of picture. Silver bath: water, one ounce; silver, forty grains, rendered decidedly acid with nitric acid. When out of order neutralise with ammonia. Boil off one-third to one-half, filter, put in bath, then add nitric acid. Developer: water, one ounce; iron, twenty grains; acetic acid, sufficient to flow easily. For *cartes* and "imperial" cards I use a Dallmeyer lens; for large sizes, a Usener instrument. My light is obtained by means of a due north skylight, the glass commencing seven feet from the floor; pitch, fifty degrees precisely; glass portion, fifteen feet wide by fourteen feet high. I use six opaque curtains on spring rollers; in winter I scarcely ever make use of them. The above style of light I have always found the best, and having thoroughly tried and built every other kind I hold to that opinion. I can make every style and effect under it, inclusive of groups of from ten to twelve persons. Time of sitting, from ten to thirty seconds; children, two to five seconds. I do not believe in using reflectors except in "Rembrandts" or isolated cases. They are false and distort. The most uncultivated part of our profession is the printing portion. I always paid particular attention to that. For busts I use a Bigelow rotary background; for figures or large pictures, Bendann's patent backgrounds. It is useless trying to produce atmospheric effect or softness on a flat ground. We use a forty-grain silvering bath, adding muriatic acid—say a drop to every ounce of solution; shake up; then add concentrated ammonia till it tests neutral; filter. Repeat the acid and ammonia every two or three days. It never turns

* Concluded from page 570.

colour, and never gets out of order. Silver from one to three minutes, and fume from five to fifteen minutes, according to the weather. To tone, wash the pictures for five minutes in water rendered acid with acetic acid—say half-an-ounce to every gallon of water. Wash in clean water. Toning bath: water, one gallon; chloride of gold, fifteen grains; acetate of soda, half-an-ounce; adding soda and gold as wanted. Nine-tenths of photographers use three to four times the gold necessary. To get rid of blisters immerse the prints for a few minutes in salt water after they come from the hypo. solution. Change the hypo. often, and use fresh paste. Roll on the warm press, and eschew varnishes, pastes, and nostrums of all kinds on pictures.

H. C. Wilt, Franklin, Pa.—Most of the time we use plain negative glass, clean. Collodion: W. B. new quick; Anthony's L. and H., &c., sometimes adding one drop of tincture of iodine to the ounce of collodion. Negative silver bath: forty grains, rather acid with glacial acetic acid. Developer: one ounce of protosulphate of iron to sixteen ounces of soft water, adding a quarter of an ounce of acetic acid when using. Sensitising bath: forty grains; about one drop of concentrated liquid ammonia to five ounces of solution; one ounce of pure glycerine to a quart of solution; half-an-ounce of nitrate of ammonia to a quart of solution; pulverised alum to a quart, about O. Shake well, and leave to stand over night; filter, and it is ready for use. We mostly use "brilliant paper," floating, in warm weather, about a minute and a-half—in cold weather, two minutes. After printing soak the prints in a weak solution of chloride of sodium or common rock salt, a lump about so O to half-a-gallon of filtered soft water. When fully dissolved soak the prints in this solution for a quarter of a minute; they are three-quarter toned then. Wash them in clean, soft water once or twice, and then tone at once quickly. Have ready fifteen grains of chloride of gold, adding one tablespoonful of whiting; then pour thereon boiling water until it changes from yellow to white, which will require from a pint and a-half to a quart of the water. Do this in a bowl or dish; let cool, filter, and this is your stock toning. It will keep for years. To four ounces of this toning stock add a quart of blood-warm water. You are now ready to tone from 500 to 1,000 card photographs. Keep up the temperature to about blood heat and they will tone quickly; then wash, and fix them in hyposulphite of soda—one ounce of soda to twelve ounces of water. Fix ten to twelve minutes. You can easily over-salt and over-tone. By this means you can tone on an average 1,000 card pictures with one grain of chloride of gold—the most economical plan I know of. Having experimented for years we now work thus. If the prints be over-salted or over-toned they will look hard, grey, spotted, and coarse. After retouching a varnished negative I lay it flat, face up, and warm it, when the varnish melts, and the pencilling sinks or penetrates. The varnish being soft covers over, and, when dry, prints much softer. You can also take a negative and set the intense side angling towards the light or sunny side. Setting still or moving you will find it to print softer than setting straight towards the sun; setting the thin side towards the sun it will print much quicker and coarser. By thus angling a much softer and finer print can be obtained.

F. M. Bell Smith, Hamilton.—In making composition pictures my plan and means are very simple. Having ascertained the number of figures to be introduced, their ages, sex, &c., I proceed with pencil or crayon to make a rough design. I then have a negative made of each, separately or in a number of small groups—say two or three in each—taking care to have the light coming from the same direction in all the pictures, unless the picture should be one where false lights are introduced—such as an interior with a light from a lamp on the table or from a chandelier—also taking particular care to have the relative sizes of the figures in proper proportions, not merely in perspective, but in relation to each other. Having now got a good negative of each of the parties I get a print from each, and, roughly cutting them out, I arrange them on a sheet of cardboard covered with brown paper (a good quality of wrapping-paper will do), pasting them on in the places I intend them to occupy in the finished picture. Now I see at once if any be in wrong proportion. If so, I have another negative taken at once before proceeding further. When I get all as I want them I have the negatives retouched, and then make my prints. In making the prints for these composition pictures a great deal of care and judgment is required. We will say that all the negatives are of equal strength. Well, if the picture be well arranged and in good perspective there must be aërial perspective as well, and, therefore, the figures in the distance must be a great deal fainter and flatter than those in the foreground. To produce this effect care must be taken to print the prominent figures as strongly as possible, and in proportion to their size in perspective relation make the others fainter. The plan I adopt is to print the distant figures very light, allowing the face to print more than the rest of the figure, and then sun them a little more in proportion to their distance. As most of these pictures are made for the purpose of copying it becomes necessary to avoid showing the lines round the edges of the pictures cut out and pasted on the surface of the large picture. This I do by laying the print, after it is cut out and perfectly dry, face down on a piece of glass, and with sharp knife pare the edges so as to make the edge of the figure when pasted on as thin as possible. With regard to the background, I can only say it requires an artist to *paint* one; but a very fine effect may be produced by selecting a nice view—say a grove, a shore of a lake, a river-bank, or some other pretty place—and enlarge it to the required size, print it on plain paper, and introduce your group in the way above described. A family might be taken in the grounds surrounding its house, with the residence in the background. The chief difficulty in the way of making family groups in interiors is that the room and furniture would have to be carefully drawn by an artist. I would say that, so far as my experience goes, there is no "money" in this kind of picture unless done with great dispatch and a number of copies guaranteed at good prices. One hundred dollars is the lowest that any artist can afford to make one of these groups for.

R. Benecke, St. Louis.—In answering your question I will try to be as brief as possible, and omit all the details of the *modus operandi*, which, I suppose, is well understood by those of your readers who take the camera to the field. Collodion: put into a bottle the following ingredients, and mix in this order:—Sulphuric ether, one pound (about twenty-three ounces by measure); Anthony's cotton, half-an-ounce; shake well; alcohol, twenty-five ounces; iodide of ammonia, 120 grains; iodide of cadmium, 120 grains; bromide of cadmium, ninety-six grains. Dissolve, and filter through cotton. This collodion will keep for years. Tint it with a few drops of iodine dissolved in alcohol if necessary. Developer (not patented): water, one pint; acetic acid, one ounce; protosulphate of iron, one ounce. Silver bath: mix one part of good glycerine and three parts of water; put a few grains of nitrate of silver into it, and expose it to sunlight for a week or two. Make your silver bath of this in the usual way, using about thirty grains of silver to the ounce of fluid. Acidify with nitric acid. I have been using this bath now for over two years for in and outdoor work. The advantage is that a plate sensitised in it will keep good for hours. In going great distances I use the precaution to carry my plate-holder wrapped in a wet cloth, after wetting it (the plate-holder) inside and out. I do not albumenise my plates. I fix with cyanide, and intensify with a fresh and weak solution of sulphuret of potassium, provided the plate has had full time, otherwise I use the mercury intensifier made in the following manner:—Add a solution of iodide of potassium to a solution of bichloride of mercury until the red precipitate is redissolved. Use it weak. This intensifier will bring out the weak detail in the shadows better than anything I know without obscuring the detail in the high lights. I prefer to clear, intensify, and varnish my negatives at home, and merely wash them after development and let them get dry. I use the commercial rock varnish, or a solution of brown gum shellac in alcohol with a little Venetian turpentine added to it. For large plates I use a developing dish—a shallow wooden dish a little larger than the plate. My camera box is of a peculiar construction, and I doubt whether I am able to give a lucid description of it without the use of a sketch. It is very cheap, very light, never gets out of order, and you cannot miss the focus with it. It is a box made of light wood of a triangular shape. Its length depends upon the focal length of the instrument, which has to be ascertained first. The board in front has an oblong hole cut in it, which permits the raising or lowering of the tube. This is fastened by means of three screw eyes to a light board, and is held in its proper position by four screw eyes in front of the box. I always use screw eyes to fasten all my instruments. A half-turn of them will cause the instrument to come off. I have three boards of different thicknesses. The thinnest one I use for views where the distance is very great; the medium one for distances from twenty steps to half a mile; and the thickest one for machinery, agricultural implements, &c., from five to twenty steps. I do not find it necessary to use a ground glass. A peep over the two sides of the box will give the angle included; by a line on top of the box it is directed to a point near the centre of the view to be taken. A beginner might need a ground glass at first, but he soon would learn to do without it. My box for 14 × 17 plates, with stand and plate-holder, I can carry in one hand for a considerable distance without any trouble; formerly I had to engage extra help for it. With this arrangement I was enabled to take views of our bridge, standing out on the Mississippi River on two or three piles driven in the ground, which I could not have taken by any other means. The shape of the box allows a person to take a view from a window looking up or down the street, when the square box could not be used without putting up a platform first. I am using the Zentmeyer lens. Those views at Chicago were taken with Nos. 4 and 5. The No. 5 will cover a 14 × 17 sharp to the corner. I have used the Dallmeyer lens, too; but they cost too much for me, and I am just as happy with my Zentmeyer's. I have also used a lens made by Mr. H. Roettger, of Philadelphia—a very fine lens. There is, I think, no lens in the market which I have not tried; but when microscopic definition all over the plate is wanted a small diaphragm has to be used, I do not care what lens you may employ, and, consequently, a long exposure has to be given. To obtain sharp pictures it is, next to a good lens, just as necessary to have a perfectly rigid stand. Mine is one of Anthony's old-fashioned, large-sized tripods—an excellent one. I came pretty near forgetting to mention my view tent. It is nothing but a bag made of three thicknesses of yellow calico, which is thrown over four sticks put together in the shape of a pyramid. I have two of them—one for microscopic work, and one for larger plates. This tent I found very useful on my late trip to Denver, Colorado. I would not exchange it for any box or any other arrangement for trips away from home. Here in the city I am using a small wagon—a dark room on two wheels, large enough to work a 14 × 17 plate in. My chemicals I put up in a basket, divided by partitions into six spaces.

PHOTOGRAPHY IN COURT.

SERIOUS CHARGE AGAINST A PHOTOGRAPHER.

An elderly man, named John Fahrbach, manager of the "Liverpool and London Photographic Company," was charged at the Dale-street Police Court, Liverpool, on Monday last, the 30th ult., with obtaining, by false pretence, £265, with intent to defraud one Julius Hartmann. Dr. Commins prosecuted, and the prisoner was defended by Mr. Froggatt, of London.

The case for the prosecutor was that the prisoner had for some time held himself out as the manager of the Liverpool and London Photographic Company. In August last he appeared to have been parting with a gentleman named Langshaw, whom he called his "secretary," and an advertisement was inserted in some London papers, which advertisement was replied to by the prosecutor. An interview took place between them, and amongst various alleged false representations were statements by the prisoner that his business was principally concerned with fine art, the making of photographic and lithographic cards for tradesmen, and the printing of bank-notes for all the banks in Liverpool. For the latter business he had thirty men employed at 23, Church-street, in Liverpool. The men were under lock and key, the business being a very responsible one. In fact, the Bank of England had become so jealous of his business that they had sent a spy to learn how he conducted it. He had also a small retail photographic business. The secretary was wanted to replace a secretary who was leaving, and who had given the prisoner as security £1,000 in consols, which he had, however, returned to him at the end of twelve months. Upon these representations the prosecutor gave up a situation in the Britannia Rubber Company, joined the prisoner as secretary at £120 a year, giving him two days afterwards as security a sum of £265, which soon afterwards, it was alleged, the prisoner converted to his own use. The prosecutor came to Liverpool on the 14th of September, and he paid the money over the next day. Everything went on all right for some time at the offices of the "company," 12 and 21, Lord-street, and 28, Church-street. However, two executions were put in in two months, and the prosecutor eventually became anxious for his money, he, at the same time, not having seen either the bank-notes or the men at 23, Church-street. On hinting his anxiety in November the prosecutor received a letter from the prisoner, who was in London, commenting on his slovenly appearance, and requesting him to make himself neater in his attire. The prosecutor then formally wrote for the return of his money, as Fahrbach had broken the contract made between them, upon which the prisoner, who was still in London, told him to attend to his business in compliance with the contract. Subsequently prosecutor received a letter from the solicitor of the prisoner in London, informing him that, as he refused to carry out the terms of the contract, he would be compelled to engage some one in his stead, and that he would hold the prosecutor liable for all losses and expenses incurred by reason of the breach of agreement in addition to the forfeiture of the £265.

Prosecutor, in cross-examination, said that when he first saw the prisoner in Liverpool he showed him books relating to the retail business.

Thomas Cowderoy said that he had been formerly in the employ of the prisoner for some time. The prisoner had a place at 23, Church-street, some time ago, but witness was the only person engaged there, and no bank-notes were produced there, either by lithography or by any other means. At 12 and 21, Lord-street, the prisoner had twenty or thirty persons employed.

Mr. T. L. Langshaw, 64, Aubrey-street, said he had formerly been in the employ of the prisoner a year and nine months. Witness had not deposited £1,000 with him, but he had deposited £100, which he had not been able to recover. Witness had an action pending against the prisoner, who had also, at the last Court of Passage, entered an action against witness, but the prisoner did not appear.

Mr. Hetherington, cashier at the Adelphi Bank, said that in September last the prisoner had an account at their bank in his own name. On the 15th September, the day the prisoner received the £265, he got a £200 bank-note changed, and he lodged £107 in the bank. The next day he withdrew £27, but on the 17th of the same month he paid in £150.

Prisoner, when apprehended in London, on the 25th November, said it was a conspiracy to injure him, and he was anxious to meet the charge.

The defence was reserved, and the prisoner was committed to the sessions, bail being accepted, himself in £265 and two sureties in £130 each.

London Photographic Society.—At the meeting of this Society, to be held on Tuesday next, the 8th instant, the following papers will be read:—*Photographic Experiences in New Zealand.* By Mr. D. L. Mundy. *Experiments with Coloured Media.* By Mr. W. B. Woodbury.

Contemporary Press.

ART IN PHOTOGRAPHY.

[Western Photographic News.]

Expression in a portrait is indispensable, whether executed with a brush or by the pencil of the sun through the aid of the camera. A portrait may be ever so skilfully finished in detail, but if it lack that stamp of individuality which every person possesses to a greater or less degree—which distinguishes him from any other person in existence—that portrait is a failure, whether executed by the aid of the camera or the brush. It lacks art. The true artist, of whatever class, strives to reproduce, with the greatest fidelity, that which already exists in nature, and he that simulates nature the closest is the greatest artist.

Art in photography consists in that arrangement of the *pose* and accessories which most closely imitates nature, and that genius (which few possess) of calling up, by their power of conversation, during the short time usually allotted for a sitting, that individuality—that expression to the face—which shows the soul of the original. To do this requires genius. Talent without genius can never acquire it. It is a gift that can neither be bought with money nor obtained by the closest study. Genius can be cultivated and improved, the same as other qualities of the mind; but no culture will give it where it does not exist. The photographer who does not possess this genius, be he ever so perfect in manipulation, can never hope to attain art in his productions. The painter has a great advantage in this over the photographer. He can demand as many sittings as he likes, and take the time to study the character of his subjects. He is not limited to one sitting of fifteen minutes; and I say that the photographer who makes life-like the faces and *pose* of his portraits through the power of genius is an artist, and his productions should be classed among the fine arts.

Let those who are assured that they possess this genius stick to the camera. The day will come when their productions will be recognised according to their merits; and those who have taken up photography to escape manual labour will be obliged to return to the plough, the anvil, and the forge. E. D. Ormsby.

Meetings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A Council meeting of the above Association was held on the 23rd ult., at 12, York-place, Portman-square,—Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed the following members were elected:—H. B. Southwell, Esq., and H. R. Robertson, Esq.

In conformity with a notice given by Mr. Glaisher at the previous meeting, Lord de Ros was elected Vice-President and T. Sopwith, Esq., Referee.

The Secretary laid before the meeting a revised copy of the rules which were passed by the meeting, and are as follow:—

Rule 1.—A subscription of one guinea per annum shall be paid by each member and subscriber.

Rule 2.—Members shall consist of none but *amateur* photographers.

Rule 3.—Other persons not photographers wishing to avail themselves of the advantages of the Association may become "subscribers."

Rule 4.—Each member shall be entitled to select two guineas' worth and each subscriber one guinea's worth of photographs every year, free of charge from the Association prints, subject to such regulations as the referees shall determine.

Rule 5.—Members shall be supplied with all additional photographs at half, and subscribers at three-fourths, of the usual prices.

Rule 6.—The Council will at all times hold the Secretary responsible for all negatives entrusted to the Association; but no commercial use being made of the plates the responsibility is limited to fair wear and tear and inevitable accidents. The Council recommend that all the negatives be sent in grooved plate-boxes, and such negatives shall remain during the year for which they are sent; but, if special application be made, they will be returned within one month after such application has been received by the Secretary.

Rule 7.—Each member will be expected to forward as many good negatives as he conveniently can, and any member sending less than six during the year may, at the option of the referees, be ranked as a subscriber.

Rule 8.—Copies of every negative in current circulation shall be kept in stock by the secretary of the Association.

Rule 9.—Prizes to the amount of not less than fifty pounds shall be awarded each year by the Council, to whom is reserved the right to fix the number, arrangement, and relative value of the prizes.

Rule 10.—Any differences which may occur shall be referred to the referees, and their decision shall be final. The prize negatives shall become the property of the Association; but in any case the proprietor shall be at liberty to decline to part with his negative, whereupon another shall be selected for the prize. A. J. Melhuish, *Hon. Sec.*

Correspondence.

THE NEW LENS.

To the EDITORS.

GENTLEMEN,—I observe in your issue of this day's date an article headed *A New Portrait Lens*, wherein you give a description of a certain instrument which Messrs. Steinheil "have considered worthy of being secured by patent," and which you are good enough to designate "another optical triumph."

Allow me to remark that "if" this be "another optical triumph" it has been achieved long ago; for my patent, bearing date September 27, 1866, already secures to *me* the right sought for by Messrs. Steinheil in their recent patent.

I have manufactured rectilinear lenses, both unsymmetrical and symmetrical, of several descriptions (*i.e.*, ratios of aperture to focus) for years past in accordance with my invention, and in proof I need only refer you to the extracts from published records described below.

I may further state that Mr. V. Blanchard (amongst others) has had one of my rectilinear *portrait lenses* in his possession for some years past.—I am, yours, &c., J. H. DALLMEYER.

19, *Bloomsbury-street, London, November* 27, 1874.

EXTRACTS REFERRED TO ABOVE.

1. *From specification of letters patent to John Henry Dallmeyer, sealed the* 7th *December*, 1866, *and dated the 27th September*, 1866:—

"What I claim as respects this part of my invention is the constructing of lenses composed of two positive achromatic or actinic combinations, of which the higher refracting denser material or flint glass lens occupies the external or exterior position in each combination; also the constructing lenses composed of two positive achromatic or actinic combinations with the posterior combination of smaller diameter than the anterior combination."

2. *From the "Photographic Journal," No.* 213. *Photographic Society of London, ordinary monthly meeting, January* 11*th*, 1870:—

"Mr. Dallmeyer submitted to the meeting three specimens of his rectilinear lenses. The first, his wide-angle rectilinear; working aperture $\frac{1}{15}$, and embracing angles of pictures up to 95° or 100°. The second, his rapid rectilinear; working aperture $\frac{1}{8}$, and embracing angles of pictures up to 75°. The third, a lens constructed on the same principles, *i.e.*, composed of two cemented combinations; working aperture $\frac{1}{4}$, angle embraced 55°; in order to show that by sacrificing angular extent of field in his rectilinear or double-combination lens an aperture as large as that of the ordinary portrait lens is obtainable. As regards general utility, however, he, Mr. D., believed that a view lens with a working aperture $= \frac{1}{8}$, and angle $= 75°$, was the best for general out-of-door photography, both as regards quickness and angular extent of picture; and for in-door portraiture he was of opinion that the diffusion-of-focus arrangement, as provided in his portrait lens, was now found to be an indispensable requisite for pictures above the half-plate size."

[From the fact that the portrait lens referred to by Mr. Dallmeyer is not mentioned in his catalogue we presume that he found in practice, what we, when reading the specification of the Steinheil lens described in last number, imagined would be the case, namely, that a better result could be obtained by making the inner surfaces of the back lens of different radii, so that they should not be "contact surfaces," precisely as carried into effect in the back lens of Mr. Dallmeyer's patent portrait combination. This slight separation of the back lenses confers an immense advantage in flattening the field, to obtain which in anything approaching to a similar degree with a *cemented* back would necessitate the latter being made exceedingly thick. We well remember the exhibition of the lenses referred to above at the meeting of the Photographic Society, in January, 1870; and in our volume for that year (page 19) we gave a description of their angular apertures and the relative exposures required with each, but we had quite overlooked the fact of their having all been of the same form substantially. Messrs. Steinheil, therefore, are undoubtedly too late in the field.—EDS.]

Miscellanea.

SUBMERGED PHOTOGRAPHY.—Dr. Neumayer has presented to the Geographical Society of Berlin a photographic apparatus for determining the temperature of the current in the greatest depths of the ocean. There are many ingenious peculiarities about the apparatus, but it is essentially a thermometer fixed in a copper bottle, with a piece of photographic paper on one side of it, and charcoal points at the terminal poles of an electrical apparatus. At any desired depth the connection is made with the battery, and the electric light produced marks the height of the mercury in the thermometer on the photographic paper.

ROSELLE'S DRY HONEY PROCESS.—The writer of our *Foreign Notes and News*, referring to a statement made by the "Peripatetic Photographer," to the effect that the honey process of Roselle differed in no essential respect from that of Shadbolt, says:—It has been said tha the dry honey process of M. Roselle is identical with the honey proces of Mr. Shadbolt, and that in describing it a few weeks back in these *Notes* we ought to have stated this fact, and not have allowed a Belgian plagiarist to deck himself out with another man's laurels. Remarks of this kind, we beg to say, are very wide of the truth. Mr. Shadbolt's honey process differs from that of M. Roselle in object, in principle, and in manipulation. The object in Mr. Shadbolt's process is to retain the free nitrate upon the film by adding to it a hygroscopic substance—honey—so that the film may not become dry, and the free nitrate of silver crystallise upon it or attack the haloid salts; but in the honey process of M. Roselle the free nitrate is thoroughly washed out of the film *before* the honey is applied to it, and that merely as an organifier, and not with any idea of keeping the film moist, because it is subsequently washed off again. Thus the two processes are, as we have said, different in object, in principle, and in manipulation. It is true M. Roselle states that if the honey be added to the free nitrate upon the plate it makes it more sensitive; but it will not, he says, keep good many hours, and he certainly does not recommend this process.

THE LIMITS OF RETOUCHING.—To the *Western Photographic News*, a correspondent (Mr. Joshua Smith) has sent the following remarks on this subject:—How many really good negatives are spoiled by excessive retouching by those calling themselves "artist retouchers!" It seems at present, from close observation, to be the sole aim of our so-called "artist retouchers" to work upon the negative until every trace of character and similarity of flesh are removed, and the retouched negative produces prints which can be compared to nothing but a soulless Chinese mask. The efforts of the "artist retoucher" tends to cover up and intensify the negative. The consequence of his strokes, which are guided by a confidence of strength in his "artistic self," is overlapping, producing cloudiness, which causes his strokes to overlap still more, and each time his artistic pencil touches the negative it carries destruction to what little good the negative may have claimed before it was passed to the pencil. Again: high lights will be put in where none are required; those over the eyebrows will be strengthened, giving the appearance of a strong top-light illumination, and the eyes fall back into the head. Some will also rub in, with a stump, lights under the eye, above the lips, and under the nose, raising the parts so treated entirely away from the balance of the face. Now, all that is really necessary is to strengthen the high lights, soften or remove spots, freckles, and heavy lines, keeping the same well modelled with the rest of the face, and avoid this overlapping. Photographers, take heed. Let your negatives show fine modelling before the artist retoucher's pencil is needed, and then see to it that it's not destroyed by overwork.

ENAMELLING.—Mr. I. B. Webster says, in the *Philadelphia Photographer*:—The glass upon which the enamelling is to be done must be scrupulously clean. Plate glass, free from scratches, is the best, although good photograph glass will do if not scratched. Blisters in the glass hurt nothing. After it is thoroughly clean, sprinkle over it, by means of a five-cent pepper-box, "powdered talc" (or French chalk), and with a tuft of cotton rub, in a circular motion (carefully going over the whole surface), until no trace of the chalk is perceptible. *Do not rub heavily.* The chalk gives a surface to the glass that assists in the lifting the enamelled print from it. Now flow the plate with collodion made as follows:—Ether four and a-half ounces, alcohol three and a-half ounces, cotton to thicken (say from five to seven grains to the ounce of solution), and twenty-four drops (or minims) of castor oil. When this flow is dry, apply the prints, *face down*, after immersing them in a gelatine solution made as follows:—Cox's gelatine one ounce, water eight ounces, glycerine fifty drops. Add the gelatine and glycerine to the water, and let it stand over night, when it will be ready for use after filtering, which can be done by warming sufficient to make the solution limpid. Allow the prints to remain in this solution about five minutes before laying them on the collodionised glass, and then pass a gum roller lightly over them to press them tightly to the glass, and also to remove the surplus gelatine. After the prints are nearly dry they are ready for the mounts. For this purpose light Bristol board is best. Use the gelatine solution for mounting, and mount on the glass as the prints lie. The whole thing must be perfectly dry before an attempt is made to remove them from the glass. When they are dry run a knife-blade around the edge to start them up, and if thoroughly dry and the work properly done they will come off all right. I forgot to say in the proper place that it is a good idea to lay upon the back, after the mounts have been applied, a weight of some kind—say a heavy piece of glass—which should remain there for an hour at least. This assists in securing a complete contact to the print. At the end of an hour remove the weight and leave the print, back up, until perfectly dry *all through*. Sometimes they start off without help, which shows perfect success Remember that "careful manipulation" is the only surety for success. A little experience will enable any one to perform this operation well.

EXCHANGE COLUMN.

Cassell's *Technical Educator* (new) complete, four vols. bound in two, half calf; Fowne's *Manual of Chemistry*, tenth edition; Galloway's *First and Second Steps in Chemistry*, with key to First Step, in exchange for lantern slides.—Address, W. L. BREARE, Sun-lane, Burley-in-Wharfedale, *viâ* Leeds.

Wanted to exchange, a quantity of first-class three-and-a-quarter-inch square lantern transparencies (plain photographic) by well known makers, and embracing a great variety of matter, cameras, small *carte* rolling-press, or other photographic requisite, for a superior coloured series of four or four and a-half-inch views (transparencies) of Egypt, the Nile, or any other subjects of a similar character.—Address, VINCENT HATCH, Huddersfield.

ANSWERS TO CORRESPONDENTS.

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

PHOTOGRAPHS REGISTERED.—

William Hanson, Leeds.—*Portrait of the Rev. Samuel Adams.*

G. C. Smith, Stroud.—*Two Portraits of H. R. Brand, M.P.*

REUBEN.—Any suitable fabric of a dark blue or a light green colour will answer.

H. G. C.—We are unable to give the information required. Write to Colonel Stuart Wortley.

P. M.—There are no imperfections in your pictures worth noticing. The calico tent evidently answers well.

SYLV.—It was in 1859 (Aberdeen Meeting) that the late Prince Consort presided over the British Association.

E. P. H.—We do not hold ourselves in any way responsible for statements which appear in our advertising pages.

T. J. E.—The person who took the portrait enclosed is quite capable of filling the place of an operator in such an establishment as that discribed.

CORNU.—When Beaufoy's acetic acid is substituted for glacial acetic acid add rather more than three times as much as that given in the formula.

W. B.—Although a good microscopic objective will not work to focus when employed in photography, it ought not to show any colour when used with an eyepiece.

FACTOR.—You can can find your remedy in the County Court. All you have to do is to prove the order was given, and that it was executed in a fair and reasonable manner.

H. R. H.—We have no personal knowledge of any artist who colours or re-touches for the profession, and if we had we should decline the invidious task required at our hands.

A. M.—The want of sharpness in the face of the portrait (which is returned as directed) arises apparently from the paper not having been pressed into close contact with the negative.

MARIANNE.—For colouring transparencies use the ordinary oil colours sold in tubes, selecting those that are transparent. Colours are now specially mixed and prepared for this purpose, and can be easily obtained See our advertising columns.

PYRO.—1. Use ammonia in the proportion of ten drops to the white of each egg.—2. Do not acidify the prints.—3. Carbonate of soda must not be added to the acetate toning bath.—4. We have not seen any of the coloured and glazed work of the firm mentioned.

B. J.—When negative paper turns brown in the manner in which yours has it indicates the need for more acetic acid in the sensitising solution. Your method of development is quite right, and we cannot offer any suggestion by which it may be improved.

W. S.—1. We feel flattered by your highly-favourable opinion.—2. In the course of another week you will find that your suggestion has been fore-stalled.—3. Glycyrrhizine is never now added to collodion, other methods of obtaining density being preferred.

J. (Oxford).—An American patent affords no protection whatever in this country; to be of any use a patent must also be obtained here. We must decline at present to offer any opinion on the validity of the patent to which reference is made in your postscript.

GEORGE S. WRIGHT.—Collodion positives may be transferred to paper by first coating the picture with an asphalte varnish, afterwards varnishing the paper by the same agent, and placing the two in contact until they are quite dry. We cannot at present enter into full working details of the process.

J. SCOTT.—*Strictly* speaking there is not such a thing as an "instantaneous" exposure. It is used colloquially by photographers to designate an exposure of a second, or a half, or even a quarter of a second; but either of these forms a period of considerable duration when compared with the zero point of instantaniety.

T. W. H.—You do not say whether you propose making your transparencies by the wet or the dry process. For the former a copying camera is all the apparatus required; while in the latter case the tannin or coffee processes may be advantageously employed. Several articles on this subject are to be found in our recent ALMANACS.

THE MANAGER.—Formic acid was formerly prepared by distilling red ants with water, but for several years it has been made otherwise, and in a more legitimate way. There are ten or twelve methods by which it may be prepared, and which are doubtless described in any good and comprehensive treatise on the manufacture of chemicals. The following is one of these methods:—To two parts of tartaric acid, three parts of peroxide of manganese, and three parts of sulphuric acid add five parts of water, and distil in a capacious retort. Fumaric acid is quite different from formic acid, and is produced by the action of heat on malic acid.

H. B. B.—The negative possesses some excellent qualities; but upon examining it with a microscope we find that the image is composed of atoms quite as large, and presenting as granular an appearance, as if it had been a wet collodion negative developed with iron. In all the gelatino-emulsion negatives we have previously seen, the deposit was so fine as to appear, under a moderate magnifying power, like a stain. Can you account for the difference? If you send a delivery order for your pictures we shall send to the exhibition rooms for them, and see that they are forwarded. We have not yet obtained the urea.

PHOTOLITHO.—Full details were given in our volume for 1870. While we are quite conversant with the other matter about which you inquire, it is scarcely one which comes within the category of those questions to which we reply in this column. At some future period we may write an article on the particular description of photographic engraving to which you allude; at present it would possess interest for, or prove valuable to, very few of our readers, and those few engaged in business outside the limits of photography. In reply to your third query, there is no hope that any one commercially interested in the matter will give you the information required for five pounds, or for even a sum much larger than that. We have heard of two hundred pounds having been offered for a practical lesson, and refused.

"A FORMER MEMBER" has written at considerable length on the subject of puffing at meetings, with special allusion to a letter by Mr. Mayland in a contemporary. The statements of this gentleman, he says, will pass just for what they are worth among those who knew him and the nature of the *camaraderie* existing between him and the prize candidate who is so unhappily situated as to require his defence. It may or may not, he remarks, be a bitter pill for those so warmly interested to swallow, but the unfortunate fact now stands recorded that Mr. Robinson really was a "third-place candidate" for the first Crawshay prize, the first prize having been awarded to Mr. Chaffin, and the second to Mr. Crawshay himself, who could not, of course, take his own money, thus causing it to be passed on to the third best on the list, Mr. Robinson. The award of the first prize to Mr. Chaffin may have caused profound consternation in a certain limited circle, but the "Former Member" is assured that no award has given more *general* satisfaction.

A LOVER OF PHOTOGRAPHY (Bracknell, Berks).—This correspondent writes:—"Will you allow me a small space in your valuable Journal to thank Mr. Edward Viles for his communication this week on outdoor photography? For the last ten years I have practised outdoor work for a few weeks in the year, but find many useful hints in Mr. Viles's paper I did not before know, and I hope to practise them after the close of 'these dull days.' Having carefully perused your Journal for a number of years I am greatly indebted to such gentlemen as Mr. Viles, Mr. Chaffin, Mr. Sutton, and several others of your eminent correspondents for many days' pleasing amusement. We sometimes read of a friend's splendid dark carriage, wonderful apparatus, &c., &c., but when practical gentlemen come forward and from their own experience tell us what to do and how to do it, in a few straightforward words, I think all honour is due to them for their kindness; for it is to such men many amateurs are indebted for the pictures they produce after careful study of such formula as these gentlemen give us."

RECEIVED.—Rev. F. Hardwich; A. Briggs; E. S.; William Bolton; S. G.; and "An Old Photo."

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual dinner of this Society will take place at the *Café Royal*, Regent-street, on Thursday, the 17th instant, when the members will be pleased to see any photographic friend who may desire to assist at this social *reunion*. Further particulars may be obtained from the Hon. Sec., Mr. Edwin Cocking, 57, Queen's-road, Peckham.

FIRE AT A STUDIO.—We learn from the *Manchester Examiner and Times* that on Friday last, shortly after half-past six, notice was received at the chief fire station of a fire at Mr. Baum's (late Messrs. Wake and Baum's) photographic establishment, St. Ann's Square. Mr. Superintendent Tozer attended, with two hand-worked engines, tender, and men, and found the fire confined to Mr. Baum's rooms, in the top floor of the building. Two jets were attached to the mains, and the fire by this means was extinguished. Serious damage was done in the top floor by the fire, and in the floors below by the water.

METEOROLOGICAL REPORT,

For the Week ending December 2, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
26	29·88	SE	—	34	35	29	Dull
27	29·71	SE	—	31	37	25	Dull
28	29·60	SE	34	36	53	25	Foggy
30	28·91	SE	43	44	45	38	Raining
Dec.							
1	29·24	N	39	41	44	34	Dull
2	29·77	N	—	31	37	26	Frosty

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 762. Vol. XXI.—DECEMBER 11, 1874.

PERMANENCE.

A few days since we were informed by Mr. Lampray of what at first sight appeared a singular thing, namely, that a friend to whom he had supplied some albumenised paper had obtained with it fine, rich, dark tones without the necessity of employing a gold toning bath. This was something very much to be desired, and our first idea was that in the preparation of the paper a salt of gold had been introduced; for, as was shown many years ago by Mr. Burnett, it is *possible* to introduce the toning agent along with the material with which the paper is salted. A definite inquiry, however, led to the statement that the paper was innocent of any adventitious aid to toning. Unless the experimentalist has discovered something possessing toning powers that may be added to his bath there is, we imagine, only one solution which can be suggested, namely, sulphur toning, in consequence of the acid state of the hyposulphite of soda fixing bath.

It is now many years since alkaline toning was introduced. At the period of its advent it was fondly believed to be a panacea for all the evils of fading, and, to a large extent, it has undoubtedly proved to be so; but, judging from the twofold fact that alkaline-toned prints are not necessarily permanent, and that sulphur-toned prints do not necessarily fade, it is evident that much yet remains to be learned.

Among the many causes of fading in prints we may give a foremost place to the formation of albuminate of silver—an organic compound which is not removed by the ordinary treatment to which the print is subjected in the course of fixing. It has been ascertained beyond doubt that the *whites* of an albumenised paper print contain silver, and that this silver is liable to undergo change. To prove this it is only necessary either to moisten the paper and expose it to a current of sulphuretted hydrogen gas, or, préferably, to moisten it with a little diluted sulphide of ammonium, when a well-marked stain will be produced. We know also that the presence of this silver compound thus affected by the sulphide is not confined to the whites, but extends all over the surface, although in the blacks it cannot be readily detected. Its presence has no reference whatever to the action of light under the negative, but is the result of the decomposition which takes place when the paper is floated on the sensitising bath.

We now come to inquire if there be any special treatment to which a print may be subjected by which this organic compound would be eliminated, either wholly or partially. We have had in our possession for many months a stereoscopic portrait of a lady, which was taken and printed by Mr. Foxlee in 1857. This picture, which is in *excellent* condition, was produced under circumstances which would now be considered unsafe; for, not to dwell upon the fact that it is mounted upon bronzed card (the bronze of which has succumbed to time), it was toned in a bath composed of hyposulphite of soda and chloride of gold—that peculiar composition, in short, known as "the old fixing and toning bath," which has long been believed by many to possess sulphuretting properties. The print had further received a limited amount of washing in cold water, and was mounted with gum. Query: Why has not this print faded? Let us inquire.

The investigations of Mr. M. Carey Lea and others have proved, curiously enough, that a print which has been toned and fixed by the same operation is actually free, or nearly so, from the organic argentine compound previously alluded to. Why this is so we shall not now pause to inquire—the knowledge of the fact is sufficient for our purpose at present. This elimination is not so complete when toning in the alkaline or neutral toning bath followed by separate fixing, unless some such agency as that recommended by Mr. Spiller —namely, the rendering of the hyposulphite solution alkaline by means of carbonate of ammonia—be resorted to.

From the foregoing premises it may be deduced that it will be advantageous if our old, and at present discarded, methods of toning were subjected to a searching revision now that some of the principles of action have become better understood.

Without further information it occurs to us that the circumstance described by Mr. Lampray is capable of being explained in this way:—Substances may be added to the fixing bath by accident or design which will supersede the necessity for using a gold bath for producing merely black tones. Among these substances we may mention chloride of lead, or even sulphuric or hydrochloric acid, or, further, the employment of a very acid sample of hyposulphite of soda without any such addition; but this is "sulphur-toning" pure and simple, and must not be confounded with the action of the gold and hyposulphite fixing and toning bath, while, further, and in this respect quite unlike the last-named bath, it leaves a large amount of the objectionable organic silver compound in the body of the picture.

ABOUT THE LANTERN.

Although we fear some of our readers may think that we are overdoing the lantern question in again bringing it prominently forward, we feel that the union between it and photography is so intimate, and the result of the union so valuable, both as a means of education and of amusement, that no suggestion for its improvement or method of increasing its popularity should be allowed to pass without notice.

Notwithstanding that during recent years considerable improvement has been made in the various lamps constructed for lantern purposes, we may fairly assume that in all cases where large popular exhibitions are to be given the lime light will be selected as the means of illumination, and that the object of the exhibitor will be to make the light as white and brilliant as possible. So far as our experience goes we believe that operators generally are now so well acquainted with the principle involved in the production of that light that they are fairly successful in producing in some cases almost too much of even a good thing; while, to add to the brilliancy by preventing loss of light by transmission through the calico screen, it is now common to have the screen covered with stout white paper.

Now we are taught that by the law of compensation there is no evil that is not productive of some good; and we suppose it is equally true that, in a general way, there is no great good which does not carry in its train some little evil. The brilliant intensity of the lime light is no exception to this rule, as it gives to the skies and high lights an unnatural whiteness which detracts materially from the artistic effects of many of the best pictures. This, however, is not all; the intensely white light is apt to fatigue the eye exposed to it for the time during which such exhibitions generally last, the results being pain in the eyeballs, a sense of tightness across the forehead, and a dull headache generally, which keeps more than one of our friends away from such meetings. This is a complaint we have frequently heard made; and as the remedy is not only simple, but is also a considerable improvement to the exhibition itself, we should like to see it generally adopted.

It consists simply of tinting the screen with a suitable colour, which will be found to enhance the beauty of the picture, and enable the eye to rest on it for any length of time in comparative comfort. As the tint will, of course, absorb a certain amount of light the screen should be covered with paper before the tint is applied. What tint is most suitable for the purpose is a question of some difficulty; in fact, we doubt whether any one tint will be found the best for all kinds of subjects. From a number of experiments we have made, in conjunction with several of our friends who are generally allowed to be men of artistic knowledge, we are persuaded that for portraits the screen should be of a slightly warmish pink, while for ordinary landscape pictures a pale yellowish-green is best, and for architectural subjects a French grey is much better than either.

Of course in a mixed exhibition it would be inconvenient to use more than one screen, but the difficulty may be easily got over by slips of glass of suitable colours being inserted between the condenser and the picture. The glass should be very pale in tint and quite free from flaws or blemishes of any kind. It may be obtained by the handful, in the shape of cuttings, from any one who produces stained glass windows, and a few experiments will show the colour and quality best adapted to the purpose. We have no doubt that the adoption of some such method of showing the pictures on a suitably-tinted ground will not only improve our exhibitions, but prevent fatiguing of the eyes and other disagreeable effects so frequently complained of.

While on this subject we may take the opportunity of saying that an examination of the apparatus used by many of our friends reveals the fact that they do not take the best method of producing their oxygen. In some cases the iron mercury bottle is still used, heated either in a furnace or in an ordinary fireplace, sufficient heat being only obtained by a vigorous application of the bellows. This, as well as being very troublesome, is far from economical, the bottle costing a good deal to begin with, and burning through rapidly. A much commoner but equally objectionable tool is the copper bottle or retort. This metal oxidises so rapidly that after each operation oxide of copper in thick scales comes off in large quantities, until after comparatively few operations the metal gets so thin as to give way in the fire, with loss of the chlorate it contains.

By far the best retort to use is the conical article, of thin sheet iron, with a screwed brass top of about two inches diameter, made by several of the manufacturers of lantern materials. One of these we have had in pretty frequent use for about five years, and it is still apparently as good as when new. Some little care is, of course, required to keep the retort in order. The fused chloride left after the operation should not, as is sometimes advised, be dissolved out by water, but be gently broken up by a long blunt-mouthed chisel, and shaken out. If the retort is to be laid aside for some time it should be coated with blacklead and brushed up like an ordinary stove. This will effectually prevent it from rust, the formation of which, during a few months enforced idleness, does it more injury than if it were in constant use. Such a retort, we may add, should not be placed on a fire, but be heated by an ordinary Bunsen burner. In this way, not only is the retort protected from injury, but the operation is so completely under control that the whole oxygen is got off steadily and certainly, without chance of loss from too rapid action. We have repeatedly seen a friend, who supplied oxygen commercially, with two such retorts fill a gasometer which contained twenty cubic feet in forty minutes, with four operations of a charge of one pound each.

A fortnight ago, under the heading of "Sharp Practice," we inserted without comment a paragraph, from the *Pall Mall Gazette*, which had been forwarded to us, commenting on the determination of a photographer to dispose of his negatives under circumstances which were there detailed. An esteemed correspondent writes to us on this subject and says:—"I cannot say whether there is something behind Mr. R.'s circular that I know nothing of; but, if not, I fail to see the 'sharp practice.' Mr. R. sent me a circular, and I was very glad of the chance of getting some negatives from him (I am an old amateur); but as I frequently ordered copies, and as it therefore seemed to me more to his advantage not to sell them, I feared my friend was in trouble, and when the *Pall Mall Gazette* published that paragraph I wrote to him. He is not, if I am to believe his reply, engaged in 'sharp practice,' but says the truth is he is dying and does not expect to survive the winter, and I fancy can photograph no more, so before departing and leaving his negatives to be sent he knows not where, he gives us, whom he thinks likeliest to care for them, the chance of buying them; or, it may be, that as he cannot work he must live, and sell his negatives to do so to some one. Now, what is the sharp practice, even if he had been quite well, but wished, for any conceivable reason, to dispose of his negatives? Are not a photographer's negatives his own, and constantly sold as stock-in-trade? Certainly; and unless there be more behind than is shown on the face of the circular, I think the *Pall Mall Gazette* a shade hard on Mr. R. If a photographer sell his business or dies, and his negatives are dispersed, in either case they may be misused, and he be unable to prevent it. I have known Mr. R. speak as if very sensitive on the point of misusing a negative. I do not think the circular intended to hold the threat of misuse over his sitters. At any rate he is one of our best photographic artists—I think the very best, from an art, though not necessarily from a manipulatory, point of view. I have been acquainted with him for a long period, and have found him a very rarely simple man of genius. I am very sorry, now he is ill, that this circular of his should have been construed as it has been." When we reproduced the paragraph in question we were not aware of the circumstances under which the proposed offer of sale was made; but the letter we have quoted above proves in the most unmistakable manner that the artist was not merely justified in doing so, but that the action taken has been appreciated.

In accordance with the predictions of *savants* the transit of the planet Venus, which has during many months past received so much attention, and the careful observation of which has involved much anxious preparations, is now *un fait accompli.* This "interesting event" took place on Wednesday morning last, between the hours of two and six o'clock according to English time, and when the great majority of the population in these latitudes were wrapped in sleep. Never before had "the worship of Venus" been more assiduously attended to, and never before have earnest and devoted worshippers received more ample reward. From such telegraphic despatches as have been received ere we go to press it will be seen that *numerous* good photographs have been obtained at some of the posts of observation. Of these stations, which numbered altogether seventy-five, Russia occupied twenty-five, America eight, France six, and Great Britain eight, in addition to those in India. There were also many private scientific observers of the phenomenon, such as the party organised by Lord Lindsay. Some time will necessarily elapse ere information from all these stations can be received in this country, but, meanwhile, the details given in another page will be perused with much satisfaction.

ON THE PHOTOMETRIC VALUE OF THE DIFFERENT LIGHTS USED FOR LANTERN PURPOSES, INTRODUCING A NEW AND POWERFUL LAMP.

[A communication to the Edinburgh Photographic Society.]

Having given a good deal of attention last winter, as well as what spare time I have had in the last two months, to the perfecting of the lamp which I intend to introduce to your notice this evening, I was naturally led also to examine and compare with one another the different lights used for lantern illumination, the results of which I wish to embody in the succeeding remarks.

I have used all the different lights more or less in my varied lantern experience; but what I have of late been directing my attention to, and what I wish more particularly to speak of just now, is their photometric or lighting value as compared with a standard candle.

I am not at present addressing you on the subject of photography, but I cannot help remarking here on the mutual benefits which photography has conferred on the lantern and the lantern on photography. Previous to the days of our art-science the lantern was little better than a toy. Then good pictures for it were both scarce and expensive, and in the hands of a few; while at the present time, thanks to photography, infinitely better and more truthful pictures can be got for it at prices so moderate as to put them in the hands of many who would never otherwise have had them. Photography is also gradually raising the lantern to be a necessary instrument for educational purposes, and will in the course of a few years be looked upon as indispensable for that purpose. It now only requires a good and easily-worked light to make it more popular than ever it has been by those who do not care to take the trouble with the lime light. To this, as you will see, I have tried to add my mite.

On the other hand, the lantern has done photography good by raising up a distinct and important branch of it, namely, the production of lantern slides. With these remarks I will enter on the subject which more nearly concerns us.

The method of comparing two lights looks, when explained, a very simple matter indeed. Let us take, first of all, the two lights to be compared, and place them at the distance of a few feet from each other. But to measure them we require a photometer of some sort. Let us take one of the simplest forms of it, viz., that of Bunsen's, which consists merely of a piece of bibulous paper of a circular form mounted on a wire frame. A piece of filter-paper answers the purpose very well. A single drop of oil, of any kind, is put on the centre of the paper. If this spot be now looked at by transmitted light it appears transparent; but if by reflected light it will be darker than the paper. The paper screen is now placed between the two lights, at such a distance from each that the spot appears equally illuminated on both sides. The distance from the screen to each light is then measured. Suppose we find that the distance from the screen to one light is two feet; we then square this figure, which gives us four. We find the distance from the screen to the other light to be, say, four feet. We also square this figure, which gives us sixteen, and then divide the one by the other, which gives us four as the result; that is, one light is four times the intensity of the other. This is in accordance with the well-known law that light diminishes according to the square of the distance. This photometer, though very simple, cannot be relied on for any grea tdegree of accuracy, especially if the lights to be compared be of a slightly-different colour.

This remark applies with greater force to another photometer which is very commonly used, viz., Rumford's, which consists of a piece of wood, either round or flat. The lights are so placed that the two shadows of the wood are thrown on a screen, either white or transparent, and the lights moved till the shadows are supposed to be equal. But if the lights to be compared be anything of a different colour this method is of very little use. There are, however, various other forms of photometers which give more accurate results; amongst these may be classed those of Wheatstone and Ritchie. The photometer which I used in my own experiments was that of Ritchie. It gives considerable accuracy, but is not capable of affording very fine results. There are two other forms of photometers which are said to give great accuracy, viz., those of Zöllner and Babinet. In both of these polarised light is used. That of Zöllner is described and figured in *Poggendorf's Annalen*, vol. 100. This form of photometer was used by Dr. Robinson, of Armagh, in estimating the light transmitted by different telescopic object-glasses. He says that "it can be made to give results thirty-five times more accurate than by the method of moving the lights." See his paper in *Trans. Royal Soc.*, vol. 159, p. 157. The other form, viz., Babinet's, is also an application of the principle of polarised light, but is more complicated than that of Zöllner. It was described by the inventor in a paper read before the British Association in 1864 (Liverpool meeting). I have not had an opportunity of seeing either of these two photometers; but as I am not altogether satisfied with the accuracy of the results obtained with Ritchie's form I intend returning to the subject again.

It is usual in photometric experiments to have a standard or unit of light with which to compare the light to be tried. The standard usually used is a sperm candle burning at the rate of 120 grains in the hour. This is termed the "standard" or "parliamentary" candle. Should the candle burn more or less than 120 grains a correction will require to be made for the same, but with the candles I used I found that no correction was necessary. My method of comparing the lights was to place the light to be tried in the lantern; then put the candle on one side of the photometer and the lantern on the other, and, having found the proper place where the lights were equal, the lens was screwed out of its place, the condenser being also removed, and the distance measured from the light to the photometer, as well as from the candle to the photometer, and then squared. The lens used in these experiments was a card lens of two and one-tenth inches aperture, and four and three-quarter inches focus. I have found that this form of lens is the best that I have ever tried for lantern purposes, as it can be used with nearly the full aperture; it both gives a great deal more light and also a much sharper picture than the lenses in common use for the lantern. I shall now give a list of the different lights I tried, with their value in standard candles, and then make a few remarks on each of them.

Argand gas lamp	30	standard candles.
Fountain oil lamp with one and one-eighth inch circular wick.	39	,,
Hincks' duplex, one and a-quarter wicks, not tried in lantern	13	,,
Sciopticon	42½	,,
My own lamp	58	,,

The light from the argand gas lamp varies very much, owing to the burner used and also to the illuminating power of the gas. In many towns the light will not nearly be so much as I make it, owing to the low illuminating power of the gas. It is also sometimes deficient from insufficiency of pressure. If that be the case, the wire should be taken out of the india-rubber tubing, which will help to increase the light. The principal recommendation that this burner has is that where gas can be had it gives very little trouble.

If care be taken to keep the fountain or solar lamp clean, and to trim the wick properly, it gives a very good light where the disc is not too large. Sperm oil is the proper thing to burn in it. But good colza or olive oil is nearly as good. The oil does not burn well at first, being cold and thick. It should therefore be made pretty hot previous to being placed in the lamp, or the lamp with the oil in it set at the side of a fire for some time. To see when the wick is properly trimmed it should be lighted, and then turned down very low, when a nice, even ring of light should appear.

We now come to the paraffine oil lamps. I may here remark that paraffine oil is better suited for the lantern than either gas or sperm oil. It has a sharper and more intense light than either.

I had not an opportunity of trying this (Hincks' duplex lamp with double wicks) in the lantern, but it gives a first-rate light for house illumination, judging from the argand gas lamp, which gave, when used out of the lantern, a light equal to thirteen candles. I should say the Hincks' lamp would be equivalent to about thirty candles when burned in the lantern. Anyone having a lamp of this kind in his house can easily adapt it to the lantern, by having a tin reservoir made of a suitable size to fit the lantern, and having an extra flange on the top of it in which to screw the burner of the lamp. The edges of the wicks should be turned to the condenser.

The sciopticon is a very ingenious lantern and lamp combined, and gives a better light than any of the lamps I have yet noticed. The fountain lamp, however, comes pretty close to it so far as light is concerned, but the sciopticon is much more easily worked. It is a great improvement on the old form of lantern. It has, however, one defect which tells a good deal against it. As the edges of the lights are opposite the condenser there is a space between them, which is reproduced partly on the screen. It thus does not give an evenly-illuminated disc, which helps to spoil the effect of the picture shown, more especially if it be a delicate or fine one.

I now come to my own form of lamp. This is a great improvement, as far as regards brilliancy of light, on any other form of oil lamp that has been used for the lantern. It is equal, when burning under the same conditions as the other lamps, to fifty-eight standard candles. It gives a clear, white, brilliant light. In constructing this lamp I have aimed more at getting a small quantity of extremely white light than a larger quantity of yellowish light, which is not nearly so good. The smaller and more brilliant the light is the better is it suited for the lantern. We have only to look at the lime light to illustrate this. As this form of lamp is meant to burn with the edges of the lights to the condenser it, therefore, has the defect I have already spoken of in the sciopticon, though in a less degree. This is entirely remedied by turning the lamp very slightly to either side, so that the wicks are not in a straight line to the condenser. It will then give a beautifully-clear and evenly-illuminated disc on the screen. It will burn well in any ordinary lantern, and gives very little trouble, as it can be lighted in a few seconds. The cost of burning it is also very slight, being something like a halfpenny per hour. The light, being very actinic, is well adapted for enlarging negatives.

I should like to have given the value of the lime light in standard candles, as used at our Society's "popular meetings," but have not had a proper opportunity, therefore I do not here intend to say much about it. We all know its surpassing excellence for the lantern, but it requires some experience to work it well and safely. For large exhibitions it cannot be dispensed with; but for private use it is not everyone that cares to be at the trouble and expense connected with it. To such as these my lamp will be the best substitute. J. M. TURNBULL.

ON VARIOUS MEANS OF REDUCING EXPOSURE IN THE CAMERA.

DURING the present gloomy season the question which most naturally arises for discussion amongst photographers is how to shorten the exposure in the camera when taking a portrait in the studio; and not only is the question most pressing at this particular time of year, but there is now most leisure for considering it thoughtfully, and for making such experiments as bear upon it.

The means of reducing the exposure in the camera are evidently threefold, viz., optical, chemical, and mechanical. We may introduce improvements, possibly, in our lenses and optical appliances; we may improve upon our existing processes so as to render our plates more sensitive; or we may employ improved methods of lighting the sitter. Let me, then, discuss separately each of these different ways by which exposure in the camera may be reduced.

First: are our optical appliances capable of improvement? Have we got the best possible portrait lens, viz., that which, with a given angular aperture—by which I mean the ratio of the aperture to the equivalent focal length—will give the most light with good definition? I must answer this question probably in the negative. The portrait lens in common use has six reflecting surfaces, owing to the separation of the two glasses of which the posterior lens is composed, and this occasions much loss of light by reflection.

Messrs. Steinheil, of Munich, have lately patented in this country a new portrait lens which is said to fulfil the required conditions. Should this new instrument be found, by general assent, to give as good definition as the common portrait lens, with the same angular aperture, we shall gain by the use of it an increase of light in the image without any compensating disadvantage, except, possibly, judging from the diagram at page 564, a little inequality of illumination, owing to the front lens being larger than the back one—a condition of things which ought to be reversed when equality of illumination is desired, because this arrangement cuts off many of the rays of the oblique pencils. Whilst alluding to this new portrait lens, I may point out an admirable feature in the mounting, viz., the series of diaphragms within the tube for preventing the reflection of light, and also the annulus round the inner edges of the lenses for cutting off reflected light from their internal edges. These are improvements in the mounting of lenses which I have often suggested, and to which I have alluded in my letter at page 519. I hope the time will come when cameras as well as lens-tubes will be fitted with similar diaphragms; for it is extraordinary how much light is reflected from the flat sides of a camera upon the sensitive plate when those sides are unprotected by diaphragms.

Another consideration in connection with the portrait lens and its quick working arises out of the question of the diffusion of focus. There are still amongst us some who believe that a general diffusion of moderately good, or even rather bad, definition in a portrait is preferable to sharp definition accompanied by a want of depth of focus. If we examine an oil painting by one of the great masters in this branch of art we find that the definition is sharp in some places and diffused in others. The result is a perfect resemblance to nature; but why it should be so is too long a story for me to enter on now. I can only suggest, as a reason, that binocular vision, accompanied by the tremulous motion of the eyeballs, is calculated to render the outlines of objects indistinct, whilst distinctness in parts is only to be gained by fixing the attention steadily upon those parts. But the artifice to which a clever portrait painter resorts in order to render nature truthfully is impossible to a photographer. Nevertheless, when the latter has recourse to the pencil in order to improve his work, he may, by taking his photograph in diffused focus, introduce afterwards the sharp touches by working upon the negative. Assuming then, for the sake of argument, that it may at times be desirable to take portraits in diffused focus, how can this best be accomplished? and can we employ a lens for the purpose which will work quicker than a common portrait lens? Here is a question worth considering.

Some years ago I tried many experiments in landscape photography with a single meniscus lens; that is to say, a single bit of crown glass ground into the form of a deep mensicus, and having a stop in front. It was extraordinary how flat a field this lens gave, and how good the visual definition was; but by no means that I could employ to find a sharp chemical focus was it possible to get a sharp negative. The definition was only just passable when the lens was pushed in through a space about one-twentieth or one-thirtieth of its focal length; and even then it was scarcely better than when the plate was exposed at the visual focus. The reason of this will be evident when we reflect that in the case of a single lens, composed of one piece of glass, we can only put the sensitive plate into the focus of rays of one particular colour, whilst rays of all other colours will be out of focus. But all the coloured rays from blue to ultra-violet are more or less active in producing chemical change in the salts of silver, so that, put our plate where we may, there will still be actinic pencils out of focus. This produces, of course, diffusion of focus wherever a single lens is employed; and it may possibly be the best and simplest means of producing diffusion of focus wherever that may be desirable. For such a purpose, then, we may use an uncorrected portrait lens of the doublet form, composed of two single glasses, and this would certainly work quicker than one composed of a pair of cemented compounds. In other words, if we give up sharp definition and go in for diffusion of focus we may work with a much cheaper and quicker lens.

It is hardly necessary to add that shortening exposure by increasing the aperture of the lens has the effect of reducing the depth of focus and injuring the marginal definition, so that this is working in a wrong direction. Still, a further improvement in the portrait lens beyond that which Messrs. Steinheil have lately made may be *possible*, and we must not suppose that we have even now arrived at the utmost perfection of which the instrument is capable. Although it may be impossible to construct a portrait lens which shall fulfil the required conditions either of one cemented compound or of two single glasses separated by an interval, still it *may* be possible to make a good portrait combination with a cemented front lens, and a single back lens of larger diameter; and this seems to be the direction in which opticians should now work for a further improvement in the instrument.*

I come now to the second part of my subject, viz., shortening exposure by chemical means. Here two methods are open to us. One consists in improving the negative process by modifications in the collodion, bath, and developer; the other by allowing diffused light to fall upon the plate before the development of the image. Let us consider each plan separately.

In the common wet process we may increase the sensitiveness of the film by keeping acid as much as possible out of it, and by using an energetic developer. By increasing the time of immersion in the bath, so as to convert more of the soluble bromide in the collodion, when that is bromo-iodised, greater sensitiveness may also be gained, but always at the risk of fog. But there are so many little points of detail connected with sensitiveness in this process, which have been so frequently and fully discussed in this Journal during the last ten years, that I need not again allude to them now.

The bromide process with the bath and an alkaline developer has afforded at times, in the hands of some operators whose skill and good faith can scarcely be doubted, glimpses of extraordinary sensitiveness; whilst the gelatino-bromide emulsion process seems to be following suit. About five years ago I published the fact of my having obtained remarkably sensitive plates by means of a bromised collodion film, excited in an eighty-grain nitrate bath, organified with Nelson's neutral gelatine, to which a little carbonate of soda was added, and developed by the alkaline method. The extreme rapidity of plates prepared with Mr. Kennett's gelatino-bromide emulsion, and attested by high authorities, evidently bears out my previous results, since the principle is the same in both methods; but these processes are still in the hands of experimentalists, and there is but little sign at present of either of them coming into general use. Nothing can exceed the simplicity of the common wet process, or the beauty of the results obtained by it under favourable circumstances; and as it meets the general wants of professional photographers these gentlemen very properly hold fast by it, and are not easily induced to give a fair experimental trial to any less simple method. Nevertheless, the time *may* come when the use of an iodide in collodion will be generally abandoned;

* A lens of this kind has not only been previously suggested in these pages, but also forms the subject of a patent.—EDS.

and I am fully justified in hoping that a more sensitive process than that in common use will one day take its place, in which bromide of silver alone will be employed. It may even turn out, perhaps, that gelatine as the vehicle of the sensitive haloid salt, as a substitute for collodion, may have the effect of shortening exposure. At any rate, there is room for hope that we have not yet arrived at the extreme limit of rapidity which the salts of silver, properly employed, will give us.

The exposure of the plate, as commonly prepared, to diffused light before development seems to be another means of shortening exposure; but so much has been written on this subject lately that I need do no more than briefly allude to it now. It appears that the common iron developer fails to bring out any trace of the action of light upon the film until after it has acted for a time which bears a very appreciable ratio to the full time of its action during a proper exposure. It may be that the early impression produced by light upon the film is effaced by the action of the free acid or the unconverted soluble haloid salt which it contains; but, be that as it may, it seems to be an undoubted fact that exposure of the plate for a brief interval to diffused light of any colour, by any suitable method under proper command, is a means of reducing the exposure. In employing this method the fear is of losing the delicate gradations of shade in the deep blacks of the negative, which have already been exposed enough, whilst striving to gain more detail in the shadows; and this risk will convince us of the importance of having recourse to the method about to be described as a mechanical means of shortening exposure, and which consists in the judicious use of reflected light for diminishing the contrasts of light and shade in the model.

A word or two will explain my meaning. It is not in general the face of the sitter, but the dress—commonly dark, and often black—which requires more light to be thrown upon it in order to bring out the details, for no photographic portrait can be deemed a good one in which the dress does not come out well. Now, if the reader will take a looking-glass, and hold it obliquely near the window of a common sitting-room, he will find that by moving it about he can throw reflected light from outside upon any part of the room, even the darkest corner. If, therefore, light be reflected in this way upon the dress of the sitter, it is evident that the exposure will be shortened, since that is always timed with reference to the dress, and not to the face. But not only so—the face will not now be over-exposed out of compliment to the dress, and the half-tones will come out so well as to require probably less aid from the pencil of the retoucher.

As a proof of the use which may be made of light reflected by a mirror, I have now before me a print from a negative of the interior of an apartment, in which a family portrait over the mantel-piece is brought out in as bold and vivid contrasts in its lights and shades as if the painting had been copied in the open air.

Thomas Sutton, B.A.

ON AN UNSUSPECTED CAUSE OF SPOTS ON *CARTE-DE-VISITE* AND CABINET PHOTOGRAPHS.

[A communication to the Edinburgh Photographic Society.]

There has not been a month during the past two years in which the photographic journals have not been engaged in discussing the origin of numberless pepper-like specks that make their appearance on photographs. Several things have been held guilty for their appearance. One suggests imperfect fixation; another careless washing; a third thinks they are caused by minute particles of iron, either in the metallic state or in the form of a salt, which find their way to the prints in the shape of dust; a fourth imagines that the disease originates with poisonous spores, and at once writes learnedly on the matter, arguing that measly photographs and measly children owe their disease to the same origin; while a lady is certain that they are caused by tobacco ashes dropped from the cigars of her male friends. It is, however, generally acknowledged that one very fertile source, if not the chief or, perhaps, *only* cause, is the bronze powder used in printing photographic mounts.

I have for several years entertained the latter opinion, and consequently I determined that no bronze printing should enter my establishment. With this object I directed that my *carte* and other mounts should be printed in anything but gold bronze, and in giving these orders I always stated my reason for so doing. Having done this I felt at ease in regard to *that* trouble. Judge, then, of my disgust when the disease appeared upon my prints after all my care. These specks only appeared upon my cabinets, and then only when mounts from a new batch were employed.

About this time some one suggested hyposulphite of soda in the mounts; but I judged the fading would be more uniform or in larger patches rather than in well-defined dots if hypo. were the cause. On examining the mounts with a magnifying-glass I found the cards were covered with my old enemy, bronze powder—the very thing I directed should not be used. This unexpected discovery leads me to warn my brethren not to be too certain that their own cards are free from this defect. In all probability my cards were printed near others that were being finished in bronze, and the fine dust will find its way in all directions if there be the slightest motion in the air.

I purposed bringing an unopened package of these mounts for your inspection, but our Secretary having called on me a few days ago a package was opened in his presence. He drew his finger across several, and found that the end of it presented quite a glittering appearance from the adherence of the dreaded particles. I have brought a few of the cards, which I lay on the table for the inspection of those interested.

"To be forewarned is to be forearmed," and my past experience will have been cheaply purchased if by directing attention to this unexpected cause of fading I remove one of the many difficulties which others as well as myself have to fight against while pursuing the fascinations of our oft-abused but much-loved art-science.

Wm. T. Bashford.

FOREIGN NOTES AND NEWS.

A Carbon Print by Maes, of Antwerp.—Methyl in the Developer.—Monckhoven's Strong Developer.—Lampué's Monster Negatives.—Copying Engravings without Distortion.

The third number of the *Bulletin* of the *Association Belge de Photographie*—an illustrated monthly publication—has just reached us, and we shall have something to say next week about its literary contents. The illustration in this number is a very fine portrait, printed in carbon, by M. Joseph Maes, of Antwerp. The print is by the single transfer process. We are told that 1,000 specimens were printed in eighteen days from only two negatives, the size being about 10 × 8 inches; but the portrait in question is an oval, measuring only 4½ × 3½ inches. The colour is extremely good, and the gradations perfect. As a print it leaves nothing to be desired.

We have now a few more words to add respecting some matters alluded to briefly in last week's *Notes*.

M. G. Noel has recommended the addition of methylic alcohol to the iron developer as a means of reducing the exposure and increasing the intensity of the image. We understand him to mean by "methylic alcohol" not the substance which bears that name in this country, and which only contains about one-tenth of its volume of the real wood naphtha, but that substance itself undiluted with common alcohol. He finds that by adding this to the developer, in the proportions given in our last *Notes*, the exposure may be reduced from about fifty seconds to ten, eight, six, or even four. This is something very remarkable, and M. Noel endeavours to account for it thus:—He says that the developer, when *common* alcohol is added to it, does not flow so readily over the film, or enter so quickly into its pores, as when wood naphtha is substituted for it, inasmuch as the latter is much more readily miscible with water than the former. Not only, therefore, are the latent details of the image better brought out, but, for the same reason, the blacks acquire greater intensity.

Dr. Van Monckhoven has also proposed to reduce the exposure and increase the density of the blacks of the negative by adding to the ordinary developer about ten per cent. of a very concentrated solution of protosulphate of iron, made by exposing that salt for a long period to the action of very hot water in a closed vessel. He states that the good effects of making this addition to the developer are threefold:—First, it permits the exposure in the camera to be reduced to one-half, or, at any rate, by one-third; secondly, the image developes to greater intensity; lastly, the developer, instead of losing its good qualities at the end of a few days, seems to improve by age, because it acts more regularly and without producing the slightest fog. Nevertheless, we are told that all these good effects depend in some measure upon the nature of the collodion and the state of the nitrate bath; so that Dr. Monckhoven is still engaged in experiments which he hopes may throw more light upon this subject. It will certainly be a singular and a puzzling fact if it should really turn out that an ordinary iron developer, strengthened by the addition of ten per cent. of a saturated solution of iron, should behave differently from a solution made originally of that strength—which could very easily be done.

The monster photographs by M. Lampué, to which we alluded last week—some of which measured five feet across—were printed from negatives taken direct in the following manner:—The plate was suspended by four strings at the corners, connected with a pulley, over the nitrate bath, which contained about eighteen litres of solution (more than three and a-half gallons), and, consequently, about £9 worth of nitrate of silver; it was easily collodionised, and was then lowered gently into the bath, and subsequently, in the same sort of way, into the dark slide. After exposure it was developed by immersing it in a bath of protosulphate of iron. The views exhibited were of *Notre Dame*, the new opera house, the bas-reliefs of the *Arc de Triomphe*, &c. They were greatly admired by the members. It would have been highly interesting and instructive if views of the same subjects enlarged from small negatives taken on the same occasion could have been exhibited side by side with them. It would be well for us all if some competent person would make a few clenching experiments of this sort, in the cause of science and for the general good, in order to set at rest a vexed question.

M. R. Benecke has suggested a very simple means of ascertaining whether, in copying an engraving, the plane of the ground glass of the camera is parallel to that of the engraving. He takes a small black board, in the centre of which is placed at right angles, so as to project outwards, a round bar of wood painted white. This board is then hung against the picture, so that the planes of both coincide. If the plane of the ground glass be parallel to that of the picture only the round end of the whitened bar will be visible, and this will be a perfect circle. M. Davanne made the very sagacious remark at the meeting, when this instrument was exhibited, that if the round end of the bar were painted black instead of white its image ought not to be visible at all upon the focussing-screen, or, at anyrate, nothing white ought to be seen upon the board.

ON THE REMOVAL OF HYPOSULPHITE OF SODA FROM PRINTS.

[Report presented to a meeting of the Photographic Section of the American Institute.]

The committee appointed to test Mr. Henry J. Newton's method of removing hyposulphite of soda from photographic prints by means of acetate or nitrate of lead would respectfully report—

That they have had four meetings since their appointment (all the members of the committee being present except Mr. D. C. Chapman), and have made a series of experiments both on foreign and domestic albumenised papers.

The committee, believing that the permanency of silver prints is of vital importance to every photographer, have neither spared time nor expense in trying to solve the problem for which they were appointed. While they set out with the belief that there were many causes why photographs have never been made positively permanent, they are still under the impression that there is nothing so likely to ruin them as the agent used for making them unchangeable.

The committee in their experiments have demonstrated in many ways the wonderful tenacity with which hyposulphite clings to albumenised silver prints, and have thus arrived at the conclusion that perhaps not one picture in a thousand was ever absolutely free from it. If, therefore, Mr. Newton's mode of removing it was true and practicable, it should be proven and made known to every photographer who takes even the smallest interest or pride in the permanency of his work; and all due praise should be rendered to him who had removed one of the chief stumbling-blocks in the way to a development of an art not only highly useful in its tendencies, but designed to elevate the æsthetic status of humanity.

At one of the meetings of the committee it was determined by careful experiments that, of all the known tests for detecting the presence of hypo., the starch and iodine was the most reliable when freshly and properly prepared. By this test, not even the 250th of a grain in an ounce of water, or $\frac{1}{120000}$th part, escaped detection. It was also demonstrated by experiments that the acetate or nitrate of lead was the best known means of decomposing the hypo. Prints that were washed after coming from the lead solution in simply four changes of water showed no trace of hypo., while those washed in running water for twelve hours or more (without the lead solution) were still found contaminated with it.

The committee also followed minutely the entire process of silvering, printing, and toning as practised by Mr. Newton, which is as follows:—

Silver Bath for the Paper.

Water	1 ounce.
Nitrate of silver	40 grains.
Nitrate of ammonia	20 „
Nitrate of lead	5 „

Aqua ammonia, sufficient to make the bath slightly alkaline.

The paper was fumed for ten minutes, and was a trifle over-printed.

First Washing Water (as originally printed by Mr. H. T. Anthony).

Water	1 gallon,
Acetic acid No. 8	½ ounce,

followed by three changes of plain water.

Toning Bath.

Water	40 ounces.
Commercial chloride of gold	15 grains.
Carbonate of magnesia	40 „
Sat. sol. of biborate of soda	½ drachm.
Tartrate of antimony	30 grains.
Or half-an-ounce of a sixty-grain aqua solution.	
Saturated solution of lime water	1 ounce.

This bath, when used, to be reduced with water to suit the speed with which it is desirable the prints should be toned.

Fixing Baths.

Water	8 ounces.
Hyposulphite of soda	1 ounce.

Bath for Eliminating the Soda.

Water	30 ounces.
Acetate of lead	30 grains.
Acetic acid No. 8	1 drachm.

In using this formula, the committee proceeded as follows:—

After the printing the pictures were soaked in the acid solution for ten minutes. They were then washed in three changes of water (not exceeding a gallon to a sheet), and placed in a toning bath, which was compounded in the following order:—

Thirty grains of chloride of gold dissolved in twenty ounces of water, with carbonate of magnesia sufficient to neutralise the solution. Then was added the biborate of soda, lime water, tartrate of antimony solution, and, finally, water sufficient to make up the bath to eighty ounces. The pictures, after being toned and fixed, were first washed in three changes of water (which took about three gallons in all), and then placed in the lead solution, where they remained from five to ten minutes, thirty ounces of solution being used for each sheet of paper (though much less than this would have answered the same purpose).

The final washing of the prints was completed by passing them through four changes of water, thus consuming much less time and less water (viz., one gallon to a sheet) than is commonly used by most of the ordinary modes of treatment.

The committee found that the fourth washing water showed no trace of hypo. by the test they adopted, and therefore believe prints treated with the lead salt perfectly free from the often deleterious effects of the fixing bath.

But to further prove whether they are right in their conclusions they propose to subject the prints, herewith presented, to such tests as may best be devised for proving their permanency.

John B. Gardner.
H. T. Anthony.
James Chisholm.
O. G. Mason.

THE SPIRIT OF THE JOURNALS.

[A communication to the Edinburgh Photographic Society.]

The month of October has seen much activity in all photographic circles. The American Conference met at Chicago, held a very successful exhibition, and, before it closed, liquidated a debt of $3,500. Many interesting papers were read and discussed, many questions instructively answered, and much complacent talk was indulged in.

The South London Photographic Society's Technical Meeting has been held, a number of useful things were exhibited, and much friendly discussion took place.

The London Photographic Exhibition was opened with contributions from some of the leading workers, both home and foreign. Of course much of the matter in the English journals relates to this large collection of pictures, and though the editors have kindly done their best to make things look as bright as possible, there is a suspicion of disappointment at the bottom of all they say. From personal inspection I think that disappointment well founded; at any rate, with very few exceptions, the work exhibited was not of a character to excite enthusiasm. There seems still a jealous suspicion that matters are not conducted with fairness; and, so long as this prevails, a hearty response from all our best workers to the invitation of the committee will be looked for in vain.

This month has given birth to two photographic societies—one in Yorkshire, and the other in Belgium. The latter is quite a national affair, with its monthly journal illustrated by photography, and sections located in various parts of the country, as Brussels, Ghent, Liege, &c. Reading its constitution makes one long for something similar in Great Britain. Surely it is time for such a movement to be set on foot. Nearly all the old societies have given in their reports, which, on the whole, are satisfactory, and with each work for the winter session has begun in earnest.

We have had a valuable contribution to science* in a series of papers by Dr. Miller, exhibiting close experimental research, on the actinic limpidity of various gases, liquids, and solids, together with the photographic effects of various spectra obtained by means of the electric spark.

Messrs. Sutton and Bolton are engaged in a courteous discussion on the theory of the latent image upon an organified bromide of silver film. When two such able thinkers, experimenters, and writers attack a problem the result cannot but be watched with the deepest interest and edification. In my estimation Mr. Sutton is *the* light of photographic literature, and our fraternity throughout the world is to be congratulated that he still continues his weekly contributions.

The Editors of The British Journal of Photography open the month by teaching us how to squint philosophically. This they do that we may be enabled to (*a*) see stereoscopically without investing three shillings and sixpence in a stereoscope, (*b*) detect wrongly-mounted stereographs, and (*c*) know the actual appearance of a stereograph from the image on the focussing-screen of the stereo. camera—advantages by no means to be despised.

Interesting and instructive papers have appeared in favour of fuming sensitised paper, with the *rationale* for so doing, and the ammonio-nitrate bath with alcohol is recommended as a substitute for those who fear the trouble or imaginary danger of fuming. I would, however, warn those who may be tempted to try the method suggested that in its present form it does not answer as well as might be wished.

Mr. Foxlee has contributed a series of exhaustive articles on saving and reducing residues. They are evidently the outcome of practical experience, and the advice given is, of my own knowledge, thoroughly to be relied on.

Our American cousins are always especially prolific in formulæ, and the past month furnished quite a large selection. It is a curious fact that when a photograph possessing special merit is exhibited we find a large number of people anxious to know the formulæ by which it was produced, as though the beautiful results of much anxious study and unwearying exertion were the mere product of so many grains of gun-cotton or so much acid, or perhaps a little morphia or zinc in the developer! With such process-mongers and mechanical dabblers photography would not rise to the work of a baker who weighs his currants, sugar, and butter; for, while the latter may always produce uniformly good edibles, the former will often find his best efforts only give a wretchedly-disheartening daub. Photography in its highest phase is the wedding of art with science, and an artist-photographer is no more governed by exact formulæ than he is by the ignorant nonsense with which some art-scribblers fill up their paragraphs. There is often as much sense in asking a photographer for a formula as in asking an artist how many bristles were in the brush by which he produced the sparkle in the eye or dimple in the cheek of one of his best portraits; and it is very encouraging to find that in the majority of the formulæ elicited from the exhibitors at Chicago "great care," "much time," "long study," and suchlike expressions are principal factors. As with all works of art, the chief ingredient of a very old formula is necessary, namely, "brains."

From the continent we have Dr. H. Vogel dealing with the same subject, while giving sensible advice to beginners. He recommends a sound theoretical knowledge, supplemented by a thorough practical experience under a really clever teacher, as a necessary foundation for all who are anxious to excel in our beautiful art-science, and sums up by stating that it is only long practice and study that make the skilful photographer.

At Chicago Mr. St. Clair exhibited great distress at the danger to which photographers exposed themselves by adding glycerine to the negative bath, asserting that in such cases nitro-glycerine was immediately formed. Some gentlemen even testified to the losses they had sustained from this cause. Surely there is some mistake here. I always understood this dangerous compound was never formed except in the presence of sulphuric acid. I have used glycerine in my negative baths and collodion, yet thus far have received no injury from so doing; and since reading the above statement I have boiled down an old bath to fusing without danger, yet this bath had a liberal dose of glycerine in it.

* Dr. Miller has been dead several years, and it is many more years since he wrote the researches alluded to: hence the opinions then expressed must not be accepted as those of recent date.—Eds.

M. Cornu has introduced an ingenious plan for correcting astronomical objectives for the chemical rays. It consists simply in separating the flint and crown lenses of the object-glass about one-half per cent. of its focal length. The operation will shorten the focus by about one-twentieth, and the aperture must be reduced by means of a diaphragm so as to retain the same angular aperture. The same gentleman intends employing the daguerreotype process for observing the coming transit of Venus.

A really valuable method for obtaining dense negatives is contributed by the esteemed French correspondent of the *News*, M. Ernest Lacan. A very thin negative is obtained by ordinary iron development, and fixed in the usual way; it is then placed in an alcoholic solution of bichloride of mercury, after which a solution of iodide of cadmium is poured over the plate until all the bichloride is converted into the protochloride. There must be a careful washing between each operation. I have pleasure in submitting a copy of an engraving done by this process. The engraving is from a periodical, the thin paper of which was much discoloured, and the whole of the back was covered with letterpress, which showed through on the face of the engraving, yet it will be seen that the reproduction from the finest lines to the broadest lights is perfect.

Those who wish to experiment with the beautiful collodio-chloride process have presented to them a method of preparing two stable solutions which, on mixing in equal proportions, make excellent collodio-chloride ready for immediate use. In the same column of the *News* may be found some suggestions on the management of development. Time and space will not allow of its reproduction, but those who have not read it should turn to page 470. Those who have no faith in what is recommended should try it, and if they see nothing in it—try it again. I always employ a somewhat similar method, and cannot understand how any photographer can afford to do otherwise.

M. Edmond Becquerel contributes a most interesting paper on the action of rays of different refrangibility upon the iodide and bromide of silver, and, in concluding, supports Dr. Vogel's observations on the value of various colouring matters (notably chlorophyle and coralline) being mixed with the collodion in order to render it impressionable by the red, yellow, and green rays, propounding several theories to account for the fact that repeated experiments have established.

In the *Revista Fotografica* Signor L. Borlinetto publishes details of his new process for obtaining photolithographic transfers. By the addition of alum and nitrate of silver in different stages of preparing the ordinary gelatine film he claims that the proofs are superior to those obtained by any other method yet published.

In connection with this subject may I reiterate the appeal of a correspondent—"Will somebody invent a small and cheap lithographic press?" I think that by this time all difficulties in the way of reproductions in fatty inks would have been overcome if the many amateur and professional photographers who are interested in the matter had a lithographic press for practical experiment placed within their reach.

A negative may, from many causes, be so damaged or imperfect as to be entirely unfit for the illustration of a book of travel, &c., yet a very imperfect print may be much superior to a hand-sketch; and it is suggested by the Editors of The British Journal of Photography that such imperfect negatives may be utilised in the following manner:—Obtain prints of a blue colour by one of the ferrotype processes; then trace or etch over this in black ink, omitting all defects, and a correct drawing is thus speedily obtained. Copy this by photolithography in the usual way.

Are we ever to have photography in natural colours? There are those who say unreservedly that it is an utter impossibility. Others, by the superposition of very thin films of pigmented gelatine representing the primary colours, each film produced from a special negative, hope to get a combination that in form and colour shall exactly represent the original model. By a somewhat similar principle others hope to get chromographs by the Alberttype and allied processes. The last phase is that in which by the direct action of light alone the primary colours are themselves formed in separate films, which it is hoped by superposition will produce a correct chromophotograph. All these modes are ingenious, and the author of each deserves all honour for his unremitting exertions, fighting almost single-handed against difficulties that meet him at every step, and not the least discouraging would be the cold indifference exhibited by those who would reap the greatest benefit should his desires be realised. I do not now hear of any hope that a photographic positive in all the richest colours of the original can be directly produced in the camera, yet I have seen one such, and never shall I forget the sight or the excitement it produced.

An excellent article appeared in the *Philadelphia Photographer*, by Mr. Chute, *On the Proportion of Light and Shade in the Photograph.* It is especially worthy of thought and application at this time and in this part of the country, where the style known among the vulgar as "Rembrandt" photographs is much in vogue. There is, however, little doubt that when the reaction sets in, as it has long ago done elsewhere, photographers will be great gainers by the knowledge they have acquired in seeking these sometimes startling abominations. Sir Joshua Reynolds found, after critically examining the works of those artists who best understood the management of light and shade, and whose works were the most universally pleasing, that their general practice was to allow not above a quarter of the picture for the light, including in this portion both the principal and secondary lights, another quarter to be as dark as possible, and the remaining half kept in mezzotint or half-shadow.

Our indefatigable Corresponding Secretary, Dr. Nicol, gives us the results of a series of experiments instituted in order to find out the value of supplementary exposures; and among his racy *Notes* he makes some well-timed remarks about Mr. D. Winstanley and what he sells as a secret.

M. Marchand has invented an apparatus for measuring the intensity of chemical rays. It is founded on the disengagement of carbonic acid from oxalate of iron under the influence of light. He has had it in action for the past five years. From the behaviour of the apparatus the inventor concludes that the chemical intensity of a June day is nearly twelve times that of an average day in December.

Dry-plate workers have a happy future before them, if all that is said of Mr. Phipps's bromide emulsion process may be relied on. Full details, from the manufacture of the emulsion to the development, may be found in his paper read before the Liverpool Photographic Association. It is similar to Mr. W. B. Bolton's process, and seems extremely simple. The plate requires no washing after it is coated, neither is a preservative applied. A large quantity of the emulsion may be made at a time, as it keeps indefinitely.

The editor of the *Philadelphia Photographer*, in his extremely amusing *Views Abroad and Across* (which I am sorry to find are so soon drawing to a close), gives Liebert's process for enlarging negatives, which he is convinced is the same as a certain English process that has been much advertised during the past year. It is a modification of the collodio-albumen process applied to positives for transparency. Prepare the following iodising solution:—

Iodide of ammonium........... 4 grammes (61¾ grains).
Bromide of ammonium........ 1½ gramme (23 grains).
Distilled water..................75 grammes (2⅔ ounces troy).

Add this solution to the whites of four eggs—about 100 grammes (3½ ounces troy)—beat to a froth, and allow to stand twenty-four hours; filter; albumenise the selected glass plates; then collodionise with any good iodised collodion, and when quite set wash under a tap. Finish by washing in distilled water. Now cover with five or six coatings of the above iodising solution, dry, and store away for future use. When a transparency is required dip this plate (previously dried over a lamp, if necessary) into the following aceto-nitrate bath:—

Nitrate of silver..............80 grammes (2½ ounces troy).
Crystallisable acetic acid...50 c.c. (1¾ fluid ounce).
Distilled water................ 1 litre ($1\frac{1}{16}$ quart).

After an immersion of one or two minutes wash in distilled water, and dry in the dark with care. Now place under a negative in a pressure-frame, and expose to diffused light from five to fifteen seconds. To develope, place in a dish of distilled water to soften the albumen, then proceed to develope with the following:—

Distilled water.................. 1 litre ($1\frac{1}{16}$ quart).
Pyrogallic acid.................. 7 grammes (108 grains).
Acetic acid .... 30 c.c. (1 fluid ounce).

The image will present a weak appearance, but may be intensified by adding a few drops of the following—

Distilled water................ 1 litre ($1\frac{1}{16}$ quart).
Nitrate of silver .... 20 grammes (308½ grains).
Citric acid .... 5 „ (77 grains).

Continue the development until the image has arrived at the requisite degree of intensity. Fix in hypo. or weak cyanide.

Wm. T. Bashford.

PHOTOGRAPHY IN COURT.

FRAUD BY THE MANAGER OF A PHOTOGRAPHIC COMPANY.

John Fahrbach, of the London and Liverpool Photographic Company, was indicted at the Liverpool Sessions, on Monday last, for having on the 15th September obtained £265 from Julius Hartman by false pretences. Dr. Commins prosecuted, and Mr. Segar defended the prisoner.

It was stated, as described in last week's number, that the prisoner advertised for a secretary for the company, and the prosecutor applied for the post. An interview took place between them, and it was alleged that the prisoner represented that the company (which consisted only of himself) was doing a business of great importance; that it was divided into several branches, engaged in printing lithographic and photographic advertisements for all the merchants of Liverpool; that it "commanded all Lancashire, Yorkshire, Cheshire, and Wales;" that the workmen of the company were engaged in printing bank notes and valuable papers for all the banks in Liverpool; and that at the branch at No. 23, Church-street, Liverpool, twenty men were locked up, they being engaged in printing bank notes. It was also stated that the prisoner said to the prosecutor that he had made a great deal of money, and had private houses of his own in Liverpool and London. Upon these representations, it was said, the prosecutor advanced the sum in question, he being appointed secretary to the company, which was said by the prisoner to be doing a good cash business. The prisoner subsequently drew the money from the bank, and used it for his own purposes. It was alleged that the representations made by the prisoner were false, and that he was amenable to the charge of obtaining the money by false pretences.

The defence was that the money was not obtained from the prosecutor by false pretences.

The prisoner was found guilty.

The learned Recorder said he would not then sentence the prisoner. It was most desirable in this case that the unfortunate young man whom the prisoner had got hold of should be indemnified if possible. If this were done it would undoubtedly make a difference in the view which he (the learned Recorder) should take of the case. Still he (the prisoner) must not understand that even if this were done the case would be condoned. He should postpone the sentence until the following morning, to see if anything of that kind could be done. If that did not happen he was not quite sure whether he should not exercise the very stringent power (for the case was a very bad one) which the law gave him of sentencing the prisoner to penal servitude.

The prisoner was then put down, and permission was given to his legal adviser to see him.

On Tuesday the prisoner was brought up for sentence, when Mr. Segar, who defended, asked the Recorder to defer the sentence till next sessions, so as to allow of compensation being made to the prosecutor. The deputy prosecuting solicitor having informed the Recorder, in reply to a question, that he had no objection to the course proposed, the Recorder deferred the sentence till next sessions.

ACTION AGAINST A TRAMWAY COMPANY.

In the Court of Common Pleas on Tuesday, last week, Mr. Justice Brett with a special jury tried the case of Evans *v.* the North Metropolitan Tramways Company. This was an action to recover damages for personal injuries. The plaintiff was a photographic portrait painter in Oxford-street, Islington, and on the evening of the 27th of April last he was on a car. He had his painting instruments with him, and, encumbered with them, he got from the top of the car. His case was that the car stopped at Barnsbury-street, and as he was in the act of stepping off the car moved on, and he was thrown into the road. His face was cut and bruised, one of his teeth was knocked out, and the doctor was of opinion that there was concussion of the brain. He was very unwell for about a month, and some of the symptoms of the injury still remained. The defence was that the plaintiff himself was alone to blame; that the car had stopped, and, after several passengers had alighted, the bell sounded and the vehicle moved on again. The plaintiff then made his appearance upon the platform and attempted to step off while the car was going on. The jury found for the plaintiff, damages £25.

Meetings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held in the Hall, 9, Conduit-street, on Tuesday evening last,—Mr. Spiller, F.C.S., President, in the chair.

Messrs. Cowe, Gale, and Pitt were elected members.

The Chairman had received a telegram from Mr. Woodbury to the effect that he could not possibly attend the meeting to exhibit certain specimens that had been promised. He (the Chairman) announced that at the next meeting the nomination of officers and Council would take place; and to obviate any invidious distinctions that might arise from carrying out the law that provided that members were to retire by seniority, although eligible for re-election, the whole body had determined upon retiring.

Mr. Hughes did not recognise the laws as being either legally passed or at all worthy of the Society, and at the February meeting he would move sundry alterations of them.

The Secretary read an extract from the minutes of a previous meeting showing that the laws had been formally passed.

Mr. F. W. Hart directed attention to the fact that, while from presentations and otherwise large stores of literature must have accumulated in the Society, that mass of literature was not accessible to the members. The supineness of the Council in this respect was deplorable, and he trusted that means would be adopted to rectify what he complained of.

Mr. D. L. Mundy then read a paper *On Photographic Experiences in New Zealand*, after which a number of Mr. Mundy's views, printed as transparencies, were exhibited on a screen by means of a sciopticon.

A vote of thanks was awarded to Mr. Mundy, and the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The second ordinary meeting of the session was held at 5, St. Andrew-square, on the evening of Wednesday, the 2nd instant,—the President, Dr. Thomson, R.N., in the chair.

The minutes of the previous meeting were read and confirmed. and the following gentlemen were admitted ordinary members:—Messrs. James Steele, William Hurin, William Haldene, John Dick, R. C. Paterson, Andrew Smart, John A. Leechman, James Mill, and ex-Bailie Wilson.

This was the most numerously-attended of any ordinary meeting since the formation of the Society.

The Secretary stated that a number of members had intimated their intention of contributing photographs for distribution by lot amongst the members present at each meeting throughout the session, in the manner found so successful two years ago, and laid on the table some fifteen for that night, the joint contribution of the President and himself.

The Corresponding Secretary laid on the table the first three numbers of the *Bulletin* of the Belgian Photographic Association, and stated that he had had several communications from the Secretary of that young Society. From the journals it would be seen that the officers were doing the work of the Society in a very workmanlike manner, and he had no doubt that they would make it a great success. An interesting feature in their journal was the giving in each number a specimen print by one or other of the various carbon processes. The specimen in the third number—a *photo-autotypie*—was a little gem that did credit both to the photographer and the printer. The same number, he might say, contained a *multum-in-parvo résumé* of carbon printing from Mungo Ponton downwards, from which, as Edinburgh men, they would be glad to see it acknowledged that the real foundation of permanent printing was laid in their own city.

The Corresponding Secretary was instructed to convey the thanks of the meeting to the Belgian Photographic Association, and to congratulate the members on the success which had already attended their efforts in the formation of the Society.

Mr. W. T. Bashford then read a paper, *The Spirit of the Journals*. [See page 592.] Before reading the paper he stated that it was not until he saw the billet that he knew so much work had been laid upon him, as he understood that another gentleman had undertaken the task. As it would not do for one who had been honoured by a seat at the council-board to set a bad example he had done the best he could, although, as he had been called on to distil the spirit of the journals with only a few hours allowed for fermentation, they must not expect anything but an unsatisfactory distillate.

At the conclusion of the paper the President, Mr. W. Neilson, and others congratulated Mr. Bashford, and hoped he would allow himself to be elected permanent "distiller" to the Society, assuring him that, judging by the quality of the spirit produced, the "fermentation" must have been complete.

Dr. Dickson wished to call attention to the method of seeing stereoscopically without a stereoscope, noticed by Mr. Bashford. He said that Dr. Nicol had taught him to do this more than fifteen years ago, and for some time he had amused himself by examining the pictures in the shop windows in that way. He was sorry to say, however, that a rather unexpected and disagreeable result had followed the practice—a serious case of astigmation, from which he still continued to suffer. In fact, he said, he had ever since that time seen all objects double, unless when he corrected the fault in his eyes by suitable lenses. It was the opinion of oculists generally that astigmation was always congenital, and never made its appearance accidentally; but his case was a very striking proof to the contrary. He could not say, of course, that the astigmation had been caused by the squinting; but he thought it right to mention the circumstance, as it might possibly attract the attention of those interested in the subject.

Mr. Ross agreed with almost every word that Mr. Bashford had said, but especially with his remarks regarding the so-called "Rembrandt" effects. He was certain that if that painter were to revisit the earth he would be ashamed to find his name connected with such trash; he was sure that the old style of lighting was in every way much better.

Mr Bashford then read another paper, *On An Unsuspected Cause of Spots on Carte-de-Visite and Cabinet Photographs* [see page 591], and handed round a number of cabinet mounts, on which, although there was nothing visible to the naked eye, the point of the finger, when rubbed across the surface, became coated with a dark but shining metallic bronze.

Mr. J. M. Turnbull then read a paper *On the Photometric Value of Different Lights Used for Lantern Purposes* [see page 588], and exhibited an improved lamp for burning paraffine oil, showing, at the same time, a number of pictures by means of a lantern lighted with the lamp. The lamp was an improved form of one exhibited before the Society last year, and was constructed on the principle of that used in the sciopticon, the object being, by the addition of a third wick, to get rid of the shadow which passes perpendicularly across the screen, and to give a whiter and more brilliant light than the sciopticon lamp.

Dr. Nicol was glad that Mr. Turnbull still continued his experiments with a determination to improve the lantern lamp. Although he did not hope that it would ever equal the lime light for the purpose, there were many cases where it would be really of more value. Many a pleasant evening could be spent with a few friends, over a number of pictures, under circumstances where the latter was altogether out of the question, but in which such an arrangement as Mr. Turnbull was labouring to perfect would be invaluable.

Mr. Ross could not say that he was at all satisfied with the performance of the lamp; the light was, he thought, a little better, but there was a want of steadiness which was very objectionable, and the images of the three flames on the screen were really worse than the shadow from the original lamp. He must say he liked the sciopticon better.

Mr. Turnbull said that the lamp had been shown to very great disadvantage. He discovered only when he came into the room that the lantern would not admit of the lamp being turned to the angle at which the shadow was got rid of, and that the lens would not screw into the flange, but had to be held in the hand. From exhaustive experiments he knew that the lamp was much superior to that with the double wick both in colour and brightness, and he should take an early opportunity of showing such to be the case to the satisfaction of the members.

Votes of thanks were given to Mr. Bashford, Mr. Turnbull, and the donors of the pictures distributed, and the meeting was adjourned.

The annual dinner of the above Society took place at the Café Royal, on the evening of Wednesday, the 18th ultimo,—the President, Dr. Thomson, in the chair, and Dr. John Nicol, in the absence of the Vice-Presidents, croupier. Mr. William Anderson, a member of the Society, who has recently succeeded Mr. Grieve as proprietor of the hotel, served up a most capital dinner, to which ample justice was done, and the members present, of whom there were a large number, spent a very pleasant evening. After the usual loyal and patriotic toasts had been duly honoured, several toasts connected with photography and kindred subjects were heartily responded to. The intervals were filled up with songs, recitations, and pleasant conversation, which was kept up till a late hour, when the party separated with a strong expression of opinion that such meetings might be very profitably held more than once a year.

The first "popular meeting" of the season took place in Queen-street Hall, on Monday evening last. The hall was crowded in every part from which the screen could be seen. The exhibition consisted of a new series of fine views of Egypt and the Nile. Dr. John Nicol gave an interesting descriptive lecture, which seemed to be much enjoyed by the audience, and received, at the close, on the motion of the Rev. Mr. Phillip, a hearty vote of thanks.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The second general meeting of the above Society was held on the 30th ult., at Leuchter's Rooms, Iregate, Bradford,—Mr. J. W. Gough in the chair.

The minutes of the last meeting having been read, it was decided to hold the annual meetings of the Society in November of each year, and to constitute the existing meeting the first of the session 1874-5.

The officers were therefore re-elected as follows:—*President:* Mr. J. W. Gough. — *Treasurer:* Mr. Rogerson.—*Secretaries:* Messrs. Crosthwaite and Holgate.—*Committee:* Messrs. Greaves, Rogerson, Sacks, and Burrow, with power to add three additional members to their number.

The meeting then devoted its attention to drawing up a code of bye-laws, which will be printed, and a copy issued to each member on his entrance.

The arrangements for the admission of new members first claimed attention, and led to a somewhat animated discussion. It was finally agreed that they be admitted by ballot, and that one black ball in five shall exclude, the ballot to take place at the meeting following that at which the member shall have been proposed.

The Chairman suggested, and it was agreed, that in the case of any member committing any immoral or illegal offence, it was desirable that there should exist in the members' hands the power to expel any such member from the Society. In order to effect this in the least objectionable manner, any member having such complaint against any other member shall place a written statement in the question box; it shall be discussed at the next general meeting, and a majority of two-thirds shall be sufficient to expel.

The question of election of officers also gave rise to considerable expression of opinion, and after much discussion it was decided that three of the committee shall retire annually in rotation, and shall not be eligible for re-election for one year; that the President shall be elected annually, but he shall be eligible for re-election for one year, but shall not hold office for more than two years successively.

The CHAIRMAN proposed that the Society should hold an annual exhibition of photographic productions, and that prizes should be offered for competition; that a competent and acknowledged art-critic should be employed to report on the artistic qualities of the works exhibited; and a committee of gentlemen of known photographic ability should report on their merit photographically.

Mr. WORMALD (Leeds) entirely agreed with the Chairman's remark, but considered it necessary that each exhibitor should be required to furnish a written guarantee that his exhibited work was his own *bonâ fide* production.

The CHAIRMAN considered that was a necessary requisition from each competitor.

After some further discussion it was decided to give the matter consideration at a future meeting.

The Secretary then received subscriptions from between twenty and thirty members, and over twenty new members were admitted.

Messrs. G. W. Simpson, of the *News*, and J. Traill Taylor, of THE BRITISH JOURNAL OF PHOTOGRAPHY, were unanimously elected honorary members; and, after a few further observations, the meeting adjourned.

The next ordinary meeting will be held on the 28th instant, at 7.30, in the same rooms, when a lantern exhibition will be given by Mr. Manley, of Brighouse, at which entertainment all gentlemen interested in photographic matters will receive a hearty welcome.

Correspondence.

PHOTOGRAPHIC SOCIETY OF FRANCE.—NEW ARTIFICIAL LIGHT.—CHEAP AND NOVEL ENLARGING APPARATUS.

THE Photographic Society of France held its meeting on the 4th instant,—M Balard in the chair.

After the presentation of new members and reading of correspondence, M. Thiel presented a collection of prints in printing-ink. Although it is my opinion that this system will eventually set aside the old one of silver salts, those presented did not come up to the standard which even the public would require for such pictures; the half-tones were smeared, and the eye sought in vain for harmony. Undoubtedly progress has been made by steps, not strides, in this branch, as we look for it to do in the nineteenth century.

M. Rousselon then produced magnificent proofs—reproductions two feet square on silvered paper, from Baudry. The cry was unanimous—"What a pity such splendid proofs are, sooner or later, doomed to destruction!"

Experimental demonstrations then took place on the new photolithographic press by M. Poirier, which, by its parallelism and divided force, permits the operator to use glass, without fear of breakage, to print from, instead of plates of metal. It resembles the ordinary lithographic press, but is made with more precision, the bed being of cast iron planed perfectly level. A lever is adjusted to the hook on the beam, and by raising or lowering this lever the operator can give—or perhaps it would be better to say "feel"—exactly the impression required.

M. Davanne, who is so well known to your readers and so esteemed by us—a *savant* who has devoted his life to photographic art, to whom every photographer in visiting France feels it his duty to pay a visit, and who in departing carries the regret away with him that time flew too quickly in his society—then rose and made some very interesting observations on metallic spots or pin points found on albumenised paper. He adjured paper-makers in general to be more careful in the fabrication of that important and necessary article. Projections were then thrown upon a sheet, and it was observed that the spots were generally at equal distances from each other—sometimes in parallel lines, and upon the back of the paper. It was proved by M. Davanne, to the satisfaction of those present, that the fault was to be attributed to the fabrication of the paper. M. Van Tenac assisted M. Davanne in these experiments.

I observed a new arrangement, by M. Van Tenac, of an ordinary moderator oil lamp, in which, by simple mechanism, he causes a flow of oxygen to be burnt at the same time as the oil. Its light, he informed me, is nearly as powerful as the lime light. If so, it will be of great service to lecturers and others.

Thus ended an interesting meeting.

I read the caution given to the readers of your Journal in the number for December 4, as to the danger of the artificial light produced by the combustion of peroxide of nitrogen charged with the vapour of bisulphide of carbon, of which I had the honour to write to you. It is true this light is by no means new; but its adaptation to photographic purposes was, I believe, unknown. It is true, also, that there is danger in employing it; but my opinion is that we ought not to exaggerate the danger, for fear of frightening from the field many who would give it a trial and invent means to render it harmless. Who does not remember the time when gas companies had great difficulty in overcoming prejudice as to the danger of that useful and now necessary article? Every evening experiments are made at my house, and portraits are done in my parlour (not having a studio), in presence of practical men, who are unanimous as to its value in photography. The generator is placed outside the parlour, on the balcony, and the gas is introduced to the burner by means of a long glass tube filled with iron shavings. Should an explosion take place (of which I doubt) no damage would thus be done. I have modified the apparatus for house use as follows. Instead of employing the generator of the peroxide of nitrogen gas of the same form as that given in a former article, I make use of a generator made as follows:—

No. 1, a stoneware or glass reservoir, jar, or pail. No. 2, a glass bell with a hole at its top, one-third filled with broken glass or chinaware, on which are laid the bars or pieces of wrought iron. This bell must be smaller in diameter than the reservoir No. 1 in order to allow place for the acids when expelled by the pressure of the gas from the interior of the bell No. 2. The height of the bell is of no consequence, let it descend to within a quarter of an inch from the bottom. The remainder of the apparatus is the same with the exception of tube No. 11, which I have replaced by a glass one filled with iron shavings or turnings. I now make use of a tube three yards long, and to do this I join three ordinary tubes together with india-rubber collars, and attach a glass tap as near as I can to the burner. I also add a little water to the acids, in the proportion of three ounces to a quart.

I hope ere long to submit to your readers an apparatus which offers no danger. M. Bardy, a celebrated French chemist, has offered his co-operation for a series of experiments having that object in view.

I now conclude by describing a cheap and novel enlarging apparatus. Take a camera with a double-extending bellows, so as to have a long range of focus, and put on its front a half-plate portrait lens. Construct a square box on the front, say two feet long, having a small door on one side to get at the lens to adjust the focus. Make a frame like that of a schoolboy's slate, arranged so as to slide easily up and down the box, and on one side of this frame fix a piece of finely-ground glass; on the other side must be fixed the positive or negative which is to be enlarged. This frame can now be pushed down the box towards the lens according to the requirements of the operator; the nearer it approaches the lens the larger will be the design on the ground glass of the swing back, and *vice versâ*. The camera is now placed on a strong stand, at an angle of about 45°, and directed like a telescope towards the sky. If possible the operator should choose a silver-bright cloud, the reflection of the light of which passes through the ground glass, then through the positive, is taken up by the lens, and then thrown on the ground glass of the swing back. A negative can be made in from forty to fifty seconds' exposure. A little retouching can be applied, if necessary, on the ground glass. E. STEBBING.

Paris, December 8, 1874.

COMPOSITION PRINTING.

To the EDITORS.

GENTLEMEN,—The paragraph in the communication of your "Peripatetic" correspondent contains a few errors which you will, perhaps, allow me to correct as far as I can. I do not know to whom the credit is due of first pasting together photographs to form combination groups, but I certainly cannot claim it, as I have never used the method.

The picture called *The Genius and Talent of Great Britain* was not, I think, a photograph, but an oil painting, which was engraved. I do not remember the names of the artists.

I have produced several combination groups, two of which—*The Officers of the* 84*th Regiment* and *The Chairmen of Sections of the British Association*, 1862—have been publicly exhibited. Possibly one or both of those may have been seen by your contributor. He is, however, mistaken as to their mode of production. The negatives of the figures are all taken of the sizes required, and printed into their places on the sheet of prepared paper, such parts only as are not required being blocked out while printing The figures, carpet, and such portions of the background as can be photographed are all printed in their places, and the print is then toned and fixed in the ordinary manner. The artist then completes the picture in Indian ink, or in any other way, and copies of any size can be made from it.

The advantage of this plan is that the finished picture becomes a valuable work of art, which cannot be the case when the "scissors and paste" plan is adopted.—I am, yours, &c., A. BROTHERS.

Manchester, December 3, 1874.

"THE NEW LENS."

To the EDITORS.

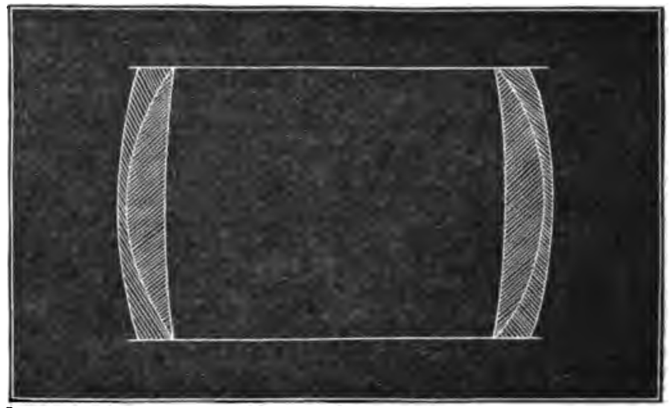
GENTLEMEN,—At the conclusion of your remarks on Mr. Dallmeyer's letter in your last issue you state that Messrs. Steinheil "are undoubtedly too late in the field." Do you mean by this that they cannot legally manufacture the lens in consequence of Mr. Dallmeyer's patent? Surely you are aware that many of our best combination lenses made for some time past have been drifting into the "rectilinear" or "symmetrical" form, which, beyond all others, combines the most perfect extreme pencils with a large flat field.

This principle was fully recognised by Mr. Thomas Grubb, F.R.S., of Dublin (Engineer of the Bank of Ireland), who obtained a patent, dated 8th October, 1857, for "An Improved Photographic Lens," from which I make the following extract:—"The crown glass, which in the ordinary view lens is doubly convex, becomes in my lens nearly plano-convex (usually slightly concave on one side), and the flint lens (usually concave on both sides) becomes in my improved lens deeply convex on one side; also, the inner or separating curve of the two lenses of the compound becomes inverted in its position, and much deeper in my lens as compared with ordinary photographic lenses. * * The lens admits of entering, with advantage, into combination with one or more other lenses of either *similar* construction to itself or of other or ordinary constructions."

The construction of the lens is described as follows:—"I form a lens of crown (or plate) glass of a suitable focus, and of a form approximating to that known as 'plano-convex;' one surface is generally, by preference, made slightly concave, and the lens is in such case a 'meniscus.' Secondly: I form a lens of flint glass one side (or surface) concave, and, by preference, of the same radius of curvature as the deeper side of the crown lens; and the other, or second side of this lens, I form of that curvature which will cause the lens to form with the crown lens previously described a nearly achromatised compound, or, more strictly speaking, a compound corrected for actinic dispersion, and which second surface of the flint lens will necessarily be a convex surface."

The accompanying diagram is a reduced copy from Mr. Grubb's specification of a rectilinear doublet on his system. The claim is as follows:—"To be used either alone and as a 'view lens,' or in combination with other lenses of *similar* or ordinary construction, the distinctive characteristics of the construction of my lens being that the two kinds of glass of which it is formed occupy inverted places in the compound, and that the internal or separating curve is also inverted, and much deeper in my improved lens as compared with ordinary or existing photographic lenses."

Mr. Grubb has deservedly acquired a world-wide fame as a scientific optician, and with him this was no visionary idea. We have to award to him the credit of being the pioneer and inventor of the present rectilinear or symmetrical forms of doublet, and his invention involves the arrangement in which "the higher refracting denser material or



flint glass lens occupies the external or exterior position in each combination" as thus claimed years afterwards in Mr. Dallmeyer's patent.

Mr. Dallmeyer has obtained a high reputation for his indomitable perseverance in improving our photographic lenses, and when in his patent of 1866 he made this claim he could not have been informed by his agent concerning Mr. Grubb's invention of 1857. Written history must do justice to all, and as Messrs. Steinheil stand high as scientific opticians we may reasonably expect an optical triumph to come from them. I make these remarks because possibly neither Messrs. Steinheil or Mr. Dallmeyer are aware of the particulars of the antecedent discovery, or the latter gentleman would scarcely have ventured on the following self-congratulatory statement contained in his letter in your last issue, that his patent of "1866 already secures to *me* (Mr. Dallmeyer) the right sought for by Messrs. Steinheil in their recent patent."

It is very deplorable that many hapless patentees should be so ill-advised as to risk the reward they have the right to expect by the insertion of frivolous and untenable claims, or by attempting to grasp too much, as in the following example:—"Also, the construction of lenses composed of two positive achromatic or actinic combinations with the posterior combination of smaller diameter than the anterior combination."

I have had in my hands compound lenses by Voigtlander and others with such smaller posterior combinations, which had been made and sold long before the existence of Mr. Dallmeyer's or any lens patent whatever.

It is not, perhaps, etiquette on my part to quote patents, but examples call for similar evidence in justice to the interests of free trade in the use of discoveries that have long since become the property of the community.—I am, yours, &c., F. H. WENHAM.

7, *Wigmore-street, Cavendish-square, W.*,
December 5, 1874.

To the EDITORS.

GENTLEMEN,—In reference to the letter of Mr. J. H. Dallmeyer in your impression of yesterday, will you allow us, as the appointed agents in England of Messrs. Steinheil Söhne, to ask that gentleman whether it is his wish or intention to try to frustrate the introduction of these lenses into this country? Besides asking this from a commercial point of view, we shall be glad of the information for the benefit of our numerous friends and customers, who, so much appreciating Messrs. Steinheil's former productions, have already made application for further particulars respecting the "new" lens.

We shall also be further indebted to Mr. Dallmeyer if he will kindly furnish us, through the medium of your columns, with particulars of his claim as to the other part of his invention, feeling bound to state that, in our opinion, the parts claimed in the communication referred to cannot possibly hold good, both having been accomplished, and records published, prior to his patent being granted. This, however, may be an error of judgment on our part, and, if so, we stand for correction.

We do not quite understand your concluding remark in the note appended to Mr. Dallmeyer's letter. Perhaps you will be good enough to make such a little more clear?—We are, yours, &c.,

69, *Jermyn street, London, S. W.*, MURRAY AND HEATH.
December 5, 1874.

[In reply to Mr. Wenham's question, as well as that of Messrs. Murray and Heath, as to our meaning in saying that Messrs. Steinheil "are undoubtedly too late in the field," we mean this—that, waiving altogether the question whether any of the existing patents for photographic lenses be good or bad, Messrs. Steinheil must not hope to receive credit for being the first to apply the principle of their aplanatic lenses to portrait combinations, in consequence of that having been already done, although, probably, not fully carried out commercially.—EDS.]

THE TRANSIT OF VENUS.

The observations of the transit of Venus appear to have been very successful, if we may judge from the information already to hand. The following telegrams have been received from various sources :—

Cairo, Wednesday, 12.30 *p.m.*—The Egyptian expedition for the observation of the transit of Venus has met with complete success. At the Mokattam Heights and at Suez the egress was observed in all its phases. At Thebes, in addition to these observations, a series of fifty photographs were taken with the Janssen's slide by Captain Abney, including the critical instant of contact. From Mokattam Heights telegraph time signals have been exchanged with Suez and Thebes, and with Greenwich, through the submarine line of the Eastern Telegraph Company, which is some hundred miles longer than the Atlantic cable and much smaller. The Venus transit is now known to have been successfully observed by Captain Orde Brown, Mr. Hunter, and Mr. Newton, Colonel Campbell, Professor Dollen, Dr. Auwers, probably Admiral Ommanney, and others.

From the Astronomer-Royal, at Greenwich, have been received the following communications :—"Colonel Tennant's observations of the transit of Venus at Roorkee, India, successful; one hundred photographs taken. Detailed telegrams of telescopic and micrometer observations near Cairo and Suez, and of photographic observations at Thebes, of the transit of Venus have been received. All are perfectly successful."

Shanghai, December 9.—During the period of the transit of Venus the weather here was overcast, and the sun obscured.

Calcutta, December 9.—The observations here were excellent. Mean time ingress centre was 7.56 a.m. ; middle 10.5 a.m. ; egress centre, 12.13 p.m.

Madras, December 9.—Satisfactory observations were almost impossible, the endeavours being frustrated by cloudy weather.

Kurrachee, December 9.—The first external contact happened before sunrise, ten minutes twenty-six seconds past six. The first internal contact took place when the sun was about four or five of his diameter above the horizon, at 6.47 a.m. ; the second internal contact occurred at about 10.35 a.m.; and the last external contact at about 11.3 a.m., when the planet quitted the sun not far from its highest point.

The correspondent of the *New York Herald* at Nagasaki telegraphs as follows :—Day cloudy, but obtained second contact well, two observers ; first and third contacts through clouds and doubtful ; 150 micrometic measures of cusps, separation of limbs, and diameter of Venus thirty-one meridian transito, both limbs ; sun and Venus eighteen micrometic measures for difference of declination of limbs at meridian ; about sixty good photographs ; ends threatening rain ; telegraph difference of longitude with Wladiwostock in November. All well.

From Wladiwostock, in Siberia, the following telegram has been received :—Professor Hall reports much haze and cloud at Wladiwostock. First and second contact of Venus observed, and thirteen photographs taken near middle of transit. A calm day, with temperature thirty-four degrees. Instruments and photographic apparatus working finely. All the American party working well.

ANSWERS TO CORRESPONDENTS.

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

Exchanges.—In our next.

Lux.—This correspondent is desirous of obtaining a view of Table Bay and Mountain, Cape of Good Hope.

Condenser.—While a water condenser would answer, one made of glass would be found to be both cheaper and better, as well as more convenient.

R. T. S.—Commence with such transparent objects as are suitable for the two-inch power. You may then advance further and practise on the diatoms, which are more easily resolved.

G. Butters.—Much more light will be lost by reflection than by absorption. It is impossible to escape loss from this cause, no matter how highly polished the surfaces of the glass may be.

M. S.—The Copyright Act will not prevent you from photographing and printing as transparencies for the magic lantern any of the collects in the Prayer Book of the Church of England.

F. M. S.—If you forward the designs to us we shall be able to get them registered for you. Or, if you are in town, you can take them in person to the Designs Office, Whitehall-place, Charing-cross. Thanks for the portrait.

Rev. S. Parker.—The lamp is excellent in principle, but faulty in construction. It is probable that the workman by whom it was repaired has put it together improperly. Very often an adjustment of a nature which appears trivial effects an almost magical change in the intensity of a light.

J. B. C.—Your communication can only be inserted as an advertisement. We have no doubt that the article merits the praise you bestow upon it; but there is another portion of the Journal exclusively devoted to affording facile means for making the public aware of the merits of trade productions.

Embry.—We do not know the various producers of optical glass in this country, but believe that the firm of Chance Brothers, of Birmingham, stands unrivalled. They will, doubtless, be able to supply glass of the particular density you require. There is no manual on photographic lens making.

Nemo.—A disc of light of such a large size would not, we fear, be capable of being employed with effect in the lantern. However, if you would furnish us with further particulars, we should then be better able to give an opinion, and as we have plenty of appliances at hand we could easily make trial of it. Intensity and smallness of dimensions are the great requisites in a flame to be employed in forming an image by means of lenses.

P. P. C.—The property that light possesses of intensifying the image has been known for many years. Blanquart-Evrard was the first to direct special attention to it. Having developed the image with pyrogallic acid he washed it, and then, by means of suitable marks, exposed certain portions to strong light, leaving the other parts protected. In this way the exposed portions acquired greater intensity. Fine artistic effects may be obtained in this way.

Our Almanac.—Ignotus.—We thank you very cordially, in anticipation, for the hints and jottings you are to send us for our forthcoming Almanac. Many other friends, some of them personally unknown to us, have kindly volunteered similar assistance, and we have acknowledged their thoughtful kindness by letter. Until you favour us with your address we have only the method now adopted of communicating with you. We shall be glad to have your favour as early as possible, and similar remembrances for the Almanac from many other readers of this Journal.

Amateur (Kerry).—1. To cement the two surfaces of glass, first make them rough by means of emery, then warm them to such a degree as to cause them to melt sealing-wax or shellac when applied to them. Sealing-wax of the finest quality forms a good cement. Some prefer marine glue.—2. The best strength of bichloride solution may be ascertained after a few trials. Make a saturated solution of bichloride of mercury in hydrochloric acid; then, having previously immersed the print in a vessel containing an ascertained quantity of water, add the solution of mercury by small and measured quantities, mixing them by means of a glass rod. Notice the quantity required to produce the desired effect, and the same proportions will serve for all future operations. Use a saturated solution of hyposulphite of soda in preparing the paper.

Archibald Briggs (Stanley Hall, Wakefield).—Our correspondent, *apropos* of what we recently said concerning the success which attended the use of dry plates prepared by Mr. Gordon, gives us his testimony on behalf of some plates he obtained from Colonel Stuart Wortley. He says: "This year, during August and September, I travelled in Brittany, and taking out four dozen of the uranium plates obtained forty-five good negatives, while of the three failures one only was in any way due to the process or the preparation of the plates. This was, I think, very good work, considering that as I was constantly moving about I had to take my chance of weather, and rarely remained more than a day (often, indeed, only an hour or two) in any place. In fact, I never exposed a second plate at any object, and some of the negatives were not developed for a fortnight.

T. H.—Of the various processes named we are best acquainted with that in which the albumen is coagulated by hot water, and this preference was the result of a trial of the respective merits of numerous processes. Let the albumen be diluted with water in the proportion of about three ounces to the white of each egg, ten minims of ammonia having also been added, and the whole then well beaten up. Apply enough of this to flow thoroughly from corner to corner, and then allow it to run off, applying some more from the stock-bottle. Having poured boiling water into the tray to the depth of over half an inch immerse the plate neatly and expeditiously, and after about a quarter of a minute remove it, rinse slightly, and apply a three-grain solution of gallic acid. In developing the only precaution to be taken is to avoid adding too much silver, for the colour is of the peculiar brown tint that is more opaque to the chemical rays of light than it appears to the eye.

Received.—G. W. Webster. In our next.

METEOROLOGICAL REPORT,

For the Week ending December 9, 1874.

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

These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks.
3	30·13	WNW	—	27	39	26	Foggy
4	30·13	WNW	36	37	47	22	Dull
5	29·76	W	45	47	52	31	Cloudy
6	29·56	W	47	49	54	39	Dull
7	29·87	W	36	38	44	32	Dull
8	29·80	W	39	40	53	32	Raining
9	28·87	N	41	43	45	35	Raining

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 763. Vol. XXI.—DECEMBER 18, 1874.

CARBON *VERSUS* SILVER.

Some strong remarks made in the last number of the *Bulletin* of the *Association Belge de Photographie* by its editor, Professor Vylder, and by one of the leading professional photographers in Belgium, M. Maes, of Antwerp, in favour of carbon printing (see our *Foreign Notes and News* of this week), have induced us to add a few words on this subject, weighing the two methods in the balance and pointing out the special advantages and disadvantages of each.

The question now for professional photographic portraitists most earnestly to consider is whether they ought, on principle and from motives of policy, to give up altogether silver printing, and issue nothing but carbon proofs. With respect to the superior permanency of the latter there can hardly be a shadow of doubt; but are they as beautiful as silver prints? can they be produced at as low a price? and is the process as simple and practicable as silver printing? Let us, then, discuss these questions in the order in which we have stated them. If to all three a reply can be given in the affirmative, then, and then only, ought professional portraitists to give up for carbon the printing process which they now commonly employ, and which still seems to hold its ground in a most marvellous manner.

First, then, are carbon prints as beautiful as silver prints? It is difficult to settle this question by a comparison of a carbon print with a silver one from the same negative, because the style of negative which is best suited for one process may not be the best suited for the other. It may be so, or it may not. The best mode of comparing the results of the two processes will be to look over large collections of fine proofs by both methods, and then decide according to the general impression produced. This we have had many opportunities of doing; and, if we may now venture to express an opinion, it is rather in favour of silver prints. Although carbon prints are in no way inferior to them as regards detail and gradation, yet silver prints seem to us to possess a freshness and vivacity which has not yet been quite realised in carbon. In short, carbon prints, in our opinion, look a little heavy when compared with silver ones upon highly-albumenised paper—not so much from the excess of glaze in the latter, for carbon prints can be glazed quite as highly as silver ones, if that be desired, but from a certain something in the combination of the pigment with the chromatised gelatine which seems productive of a heavy, leaden effect, though but in a slight degree. This may be owing, perhaps, to the presence of the chromic salt, for it does not occur in the Woodburytypes, which are quite as fresh and "juicy" in their vigour as silver prints, and quite as beautiful in colour. And this reminds us that it is only within the last two or three years that prints in carbon—or, more properly speaking, upon pigmented tissue—have been at all pleasing in colour, although an infinite variety of colours for his tissue was apparently open to the choice of the printer in pigments. We have seen numerous pigment prints which, although admirable in all other respects, were so bad in colour and in general effect as to be unpresentable, from an artistic point of view. It must be admitted, however, that in the autotype process, as now practised, that defect has been completely overcome; but, at the same time, we must remember that although *carbon* may be permanent in its black colour, other pigments may not be equally unchangeable, particularly those of vegetable origin, and care must be taken in the selection of tints by manufacturers of pigmented tissue. Water-colour drawings, we know, sometimes fade.

We have now said, perhaps, all that can fairly be urged against carbon printing, or, more properly, the autotype process. The manipulation, both by single and double transfer, is simple enough, and the sensitive pigmented tissue is at least twice as sensitive as silvered paper. If it be true that the progress of the printing in the pressure-frame cannot be watched, as in the case of silver printing, it is equally true that greater sharpness is secured by not having to open the back of the frame to watch the operation. Every facility is now offered by the Autotype Company for practising their interesting process. Pigmented paper of a beautiful tint and fine quality can be purchased from them, as well as every other requisite; and we feel sure that any skilful photographer may, by following the lucid directions contained in their *Manual*, succeed with the process after a very few days of careful experimenting with it. Now that the negative itself can be so nicely vignetted, and put in order for printing, by the various methods of retouching and by the "dusting-on" process with blacklead, all the usual dodges in silver printing may be imitated successfully in pigments; and as for the higher price of autotype portraits, we quite think that the public might be willing to pay more for permanent proofs if the negative were so good as to render the permanency of the prints from it a desirable quality. Then, again, as to the slight inferiority which has struck us when comparing the *best* carbon with the *best* silver prints in point of freshness and vigour, that may be hyper-criticism on our part, and a very minor matter, particularly when we remember that prints from the same pigmented tissue must be all identical in colour, whilst silver prints vary considerably, being sometimes thin, poor, and mealy. Lastly: it is impossible to overvalue the great merit of superior permanency which carbon prints most undoubtedly possess, and the satisfaction which a photographer must feel when he can conscientiously guarantee the durability of his works.

But, after all, are silver prints *necessarily* so perishable as some enthusiastic advocates of the rival method endeavour to make out? Experience and facts seem to say "no" to this query. If metallic silver be so subject to change on exposure to common atmospheric influences as some people affirm, how is it that our *negatives* so rarely fade, whether upon glass or paper? Who ever heard of a paper calotype, developed by gallic acid upon iodide of silver, fading? We have now before us several prints from Blanquart-Evrard's *Album Photographique de l'Artiste et de l'Amateur*, published in 1852, and printed by the above method, which are as fresh and perfect as on the day when we first received them from his establishment at Lille. Then, again, some silver prints are by toning converted into gold ones, and what might perchance be true of silver may not be equally true of the more noble metal, gold. Many of us, again, have in our possession silver prints which, although produced by the usual process, have not changed for years. All this proves that silver prints are not *necessarily* subject to change, and we cannot reasonably predict of them all indiscriminately that they *must* assuredly fade, because facts are against such an assertion.

The most singular fact in connection with fading is that it commonly happens to prints which have been made upon *chloride* of silver. Thus, collodio-chloride prints upon glass seem to fade quite as readily as chloride prints upon paper. The same remark is true of developed prints upon chloride of silver, which are not nearly so permanent as those which are developed upon iodide of silver. If we may venture to explain this, the difference seems to arise from the fact that in a developed iodide print the metallic silver, being obtained almost entirely from the developer (gallo-nitrate of silver in a state of decomposition), is thrown down and accumulated in masses, where the atoms are more closely compacted together than in the case of a chloride print, where a much stronger visible image must be produced before development begins.

In conclusion: it would seem that professional portraitists have the choice between two courses. One is to give up silver entirely for autotype printing; the other is to seek earnestly for some means whereby the fading of silver prints shall be absolutely prevented. The Woodbury process and collotype seem to be quite out of the question for professional portraitists, where only a small number of proofs are required.

As for the question of carbon *versus* silver, so far as paper is concerned, things will probably remain as they are until carbon prints are *quite* as beautiful, *quite* as cheap, and *quite* as simply produced as silver ones. *Then*, perhaps, their superior permanency may turn the scale, but not before. Photographic printers like to see what they are about; and the idea of an actinometer, hot water development, and pigmented tissue, which may possibly stick to the negative and destroy it, has never very much charmed their fancy. We rave sometimes about permanency, posterity, and the future, but, after all said and done, what creatures we are of the present hour!

"Quid sit futurum cras fuge quærere," &c.

THE TRANSIT OF VENUS.

Owing to the great expedition in telegraphing the results, we were last week enabled to publish the fact that extraordinary success had crowned the efforts of at least many of the *savants* included in the parties who had proceeded to the various assigned stations to observe the transit of Venus, and that photography had played an important and most successful part in this international scientific foray. Now that much more information than that given last week has been received, we are enabled still more strongly than before to report that the services rendered by photography in recording this phenomenon—a phenomenon by which is determined both the size of the sun and its distance from our own planet—have been of incalculable value. The nervous trepidation of an observer who feels conscious that the eyes of millions of his fellow-beings are, metaphorically speaking, set upon him, may militate against that accuracy which in a matter of this kind is so surpassingly important in observing the phenomenon; but, as the Astronomer-Royal observed on Friday evening last, when addressing a meeting of the Royal Astronomical Society, "photographs have no nerves." In speaking of the comparative accuracy of photographs obtained on glass and on silvered copper plates—or, in other words, between collodion and the daguerreotype process—the Astronomer-Royal says—"there is no comparison between them, the latter being infinitely more accurate." The daguerreotype process was that used by the French observers.

From Nagasaki and Kobe M. Janssen reports several good photographs taken. Professor Harkness, of the American Transit Expedition at Hobart Town, reports that, notwithstanding the weather was bad, no fewer than a hundred and thirteen good photographs were taken during the passage over the sun's disc. From Thebes Capt. Abney reports:—

"Beautiful morning. Sun rather shaky at first, nice and sharp at time of contact, and good observations, though differing slightly in time. Sun pictures good. The fifty photographs in Janssen's slides include internal contact; external contact not taken. No black drop apparent in photographs after careful examination."

Referring to the foregoing, the Astronomer-Royal made the following observations at the meeting to which allusion has been already made:—

"This shows that attention has been paid to the precept which I particularly inculcated upon observers who were to use the Janssen instrument, namely, that they were to judge as well as they could when the actual contact of the limbs would take place within 20" or 30", and then set the Janssen to work. If they had set it to work too soon the revolution would have been exhausted before the phenomenon came; and if they set it to work too late the phenomenon would have been lost by delay. But the telegram proves that by attention to my precept, and by being accustomed to the approach of Venus in our model, Captain Abney, who is a cool observer, was able to fix precisely on the time when he might expect the actual touch within the 50" in which the Janssen would be turning round. I am entitled from this circumstance to attach great importance in the first place to the coolness and care of Captain Abney, and in the next place to the advantage which has been gained by the preliminary use of the model. I may mention here that that model is not of my invention. I first heard of it on the continent, but I got one and adapted it to my own circumstances, believing that practice with it would be of great benefit to the observers; and they were of the same opinion, for before they went they all petitioned that each might have a model for himself, so that there are actually five British models beside the one I have at home, and all have been useful in their way. The remark of Capt. Abney that 'no black drop apparent after careful observation' is very important. It so happened that in the telegraph the word is 'carnal' examination, but there can be no doubt 'careful' is the word. It is important, because photographs have no nerves. Although the record is imperfect as it is from want of details, it is very important from the fulness of the characteristic observations."

A telegram from Ispahan records the fact of nineteen serviceable photographs having been taken, despite bad weather, by Herr Foester.

We give an extract from a letter by Captain Abney (who is "special correspondent" of the *Daily News*), which appeared in yesterday's issue of that paper. Captain Abney, writing from Thebes on the 24th ult., says:—

"The work of preparation for the transit is progressing, and, excepting practice on the mock transit, all other extraneous work is put on one side during the daytime, though in the evenings the amusements are generally of the most scientific character. By-the-bye, I may as well explain that the mock transit is a model which shows, it is presumed, exactly the different phases of the transit that will occur on the morning of the 9th. Venus is represented by a small, circular, black disc of about two inches in diameter, which, at 200 yards, subtends the same angle that the planet does, viz., about sixteen seconds of arc. This disc is made to travel across a semicircular opening, which also, at the above distance, is made to represent the sun. Through this opening is reflected sunlight by a mirror. When the mock Venus is nearly making visual contact, as observed through the telescopes or photoheliographs, the phenomena of the black drop, &c., are seen and noted. By this means much of the uncertainty attendant on ascertaining the true time of contact at the critical moment will be eliminated, as each observer will have a knowledge of what he may expect.

"As I said before, our amusements in the evenings are scientific. Colonel Campbell has got his seven and a-half inch equatorial in capital working order, and in this cloudless atmosphere the nebulæ, double stars, and moon are splendid objects with which to while away the hours before bedtime. For the last three or four nights Captain Abney and his sappers have been taking photographs of the moon in the same instrument, Colonel Campbell, with his usual mechanical skill, having fitted an impromptu camera to it. I am quite aware of the difficulty there is at home in securing a good night, free from mist and atmospheric disturbance, for lunar photography, and can fully appreciate the joy that reigns in the photographic heart at being able to step out of the boat into the canvas observatory and take the satellite at any hour of the night if she only be visible. The resulting negatives seem very fine, and an enlargement taken from one promises to give capital results. Would not Mr. De la Rue revel in these cloudless nights, when the highest power of the telescope can be used without noticing the least tremor? Truly for astronomical work the climate leaves nothing to be desired, though it must be owned that in the early morning after sunrise we have slight mists, which, if they do not disappear within the next fortnight, may be a drawback for observing the transit. The north wind which a few days since promised to blow has failed again; when it does set in, this difficulty will vanish. As it is quite due now, there are great hopes that such will be the case.

"Captain Abney has been put into telegraphic communication with Cairo direct, a distance of 450 miles, and yesterday he sent his first official messages to his chief, Captain Browne, regarding taking the time to obtain longtitude. This will not be completed till Dr. Döllen, the Russian astronomer, comes, as he is to give the English party local time and latitude with his instruments. He is expected in four or five days, having left Cairo some five or six days ago by a steamer. Probably Dr. Auvers, the German astronomer, will accompany him; if so, we shall be a large party, representing three different nationalities. At any rate, all will pull together, and enter into a conspiracy to attain the object of all the expeditions. Dr. Döllen is, I believe, son or brother-in-law to the well-known Struve, and was accredited as a man of mark in his own country. The photographic part of the expedition is getting on capitally here; a few hitches in the difficult art have occurred, but, thanks to the patience of the sappers, have been surmounted. Any morning at seven o'clock may be seen the whole of the drill gone through, with a precision worthy of the military element. If practice makes perfect there ought certainly to be no imperfections on the 9th."

Precise and elaborate details will not reach us for several weeks yet; but, meanwhile, it is gratifying to learn that such a measure of success has attended the efforts of the various parties of observers of this extraordinary phenomenon, and whose accurate observations were pregnant with momentous issues in enlarging the boundaries of scientific knowledge in connection with the great planet which exercises so important an influence over our solar system.

THE EFFECT OF MOTION.

It is now many years since the effect of motion was obtained in the stereoscope by means of the "persistence of vision," as that property is designated by which an image thrown upon the retina remains there for an appreciable length of time after the object itself has been withdrawn, or has been made to change its position. The whirling stick with the blazing point furnishes an example of persistence of vision with which every schoolboy is acquainted.

The thaumatrope, phenakistiscope, or wheel of life, affords an example of instruments specially adapted for taking advantage of the phenomenon of persistence of vision to exhibit objects in apparent motion.

Bearing this in mind, and bearing in mind, further, that photography was long since pressed into this peculiar service, and that several articles, some of them illustrated, have appeared in The British Journal of Photography describing apparatus specially constructed for showing the effect of motion by bringing in rapid sequence before the eye pictures of the same object taken under such varying circumstances as that displayed where a blacksmith is seen holding a hammer at first raised and then bringing it down upon the anvil, or children playing at see-saw, pugilists belabouring each other, fencers thrusting or parrying—bearing in mind, we say, that motion of this kind has been well known in this country, among photographers at least, for many years, we now proceed to give the details of a patent which has been obtained for a means of producing an effect somewhat similar in character to that above alluded to, and entitled "A Process for Obtaining Animation of Drawn Figures." The patentee is Mr. Antoine Ray, of Clapham Common.

The principle of the invention rests on the possibility of observing virtual lifelike motions of images or plates by means of two combined images, which, appearing and disappearing in turn, produce a delusive motion either of a substance of some kind or other or of persons or mechanical machines. The practical utility of this discovery, says the patentee, rests on the possibility given, by example, to a teacher explaining the motion of a mechanism, to make the work itself of the mechanism follow the demonstration by showing to his hearers, by an illusion, the apparatus really working, though the latter be only drawn. With his system of two combined images appearing and disappearing in turn Mr. Ray obtains a new stereoscope, which he calls an "animated stereoscope," in which persons or objects may be seen moving.

He obtains the animation by means of the alternate appearing and disappearing of the two images, the one appearing when the impression of the other after its disappearance is still subsisting on the retina; thence virtual motion from the moment the two images are combined in such a manner as to express the two extreme positions of a motion. Thus, for example, one of the two images representing a fencer parrying, and the other that same fencer entirely lunging, those two images in juxta-position being superposed by means of the lenses of the stereoscope, move and present the illusion of the motion of a fencer lunging and then parrying from the moment that both of those images are alternately hidden by means of an opaque and movable screen working either by the aid of a pendulum or otherwise.

If those two images, instead of being on two plates in juxtaposition seen through a stereoscope that unites them, are drawn on one plate superposed the one on the other, the same effect of animation and motion is obtained without any other instrument but a screen placed between the eyes and the plate, moved in the necessary timed motion so that it may produce the eclipses and the apparitions of each image alternately; but, in order to make that fact possible, one of the images is produced in coloured lines—in red for example—and the other superposed to it in green; and the screen is also divided in two parts—one in red glass or transparent colour, the other in green. When one looks through the red part of the screen the red image is annihilated and the green image appears, and *vice versâ* when one is looking through the green transparent. These eclipses rest on the principle of coloured transparents allowing rays of their own colour only to pass.

This may also be applied to the magic lantern in order to give life to its personages.

In a topographical plate one can equally, by means of transparents of different colours placed on it, hide certain lines traced in certain colours, and allow only those one wants specially to observe to be seen. In this case there would be only a momentary eclipse, but no animation.

With the aid of screens furnished with coloured transparents we can obtain not only rectilinear and oscillating motions, but also circular motions, producing, for example, the illusion of a whirling wheel, provided the circonference of that wheel be painted in different colours, and the screen with corresponding colours be worked in such a manner so that it produces apparitions and eclipses in the limit of the duration of the vision of the eclipsed parts on the retina. The animation of certain figures prepared *ad hoc* can still be obtained by means of coloured or non-coloured glass solids moved about without eclipses on these plates.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

"If any provide not for those of his own house, he is worse than an infidel."

We think it properly within the province of our editorial duties to direct the attention of our readers to the circular issued by the Photographers' Benevolent Association, which has recently been sent to photographers throughout the country, and which now lies before us. The system of life insurance, now so extensively carried out in our own as well as in other countries, is so well understood and so generally taken advantage of that it is not necessary to say anything about it, except to express the hope that there is not an adult photographer in the land who has not insured his life; if there be, we advise him to do so at once. In nine cases out of ten the photographer either has home ties, with all the responsibilities and pleasures attached to family life, or is looking forward to the possibility of forming them; and we can assure him that it will give brightness and joy to many an otherwise dreary hour to know that, in the event of his being taken away, some slight provision has thereby been made for the wants of his loved ones during the time of their greatest need.

Life insurance, however, great as its benefits undoubtedly are, is as generally carried on, unable to meet all the requirements of several of the classes into which society is divided, and especially of those—and a very large class we fear they form—who are said to "live from hand to mouth." Why such a large number should continue to live in this uncomfortable position is somewhat difficult to understand; but it is more than probable that improvidence and small incomes combined are the main cause. Be this as it may, there is no doubt that photographers and their assistants contribute somewhat largely to the number so unfortunately situated. This "from-hand-to-mouth" method of living is all very well so long a work is plentiful and the worker continues to enjoy the blessing of good health; but in a season of slackness or sickness it necessarily results in much misery and suffering both to himself and to those depending on him. In such straits as these the Photographers' Benevolent Association is intended to come in as a friend in need, in order that, by its timely aid, the pot may be kept boiling till the head of the house is able to resume his accustomed work, or to help him to a situation if he be able and worthy of it.

It has often been suggested that societies on a much larger scale than that which we have at present specially in view should be organised—societies sufficiently large to embrace whole districts and all classes of the community in their operations—under the impression that the cost of management would be much less in proportion than that of several smaller associations. It must, however, be kept in mind that various trades and professions are subject to special risks, and in consequence, on the whole, that a society intended for the members of one particular branch of trade is much more likely to be carried on with even-handed justice to all concerned. There is little doubt, and we regret to have to confess it, that photographers' assistants are at least as liable, if not more so, to suffer from the two evils a benevolent society is intended to remedy—sickness and want of employment—as any other class. The confined space in which the greater part of the work is done, and a considerable portion of his time spent, is generally so charged with the volatile material in use as to be far from conducive to health; while the ever-fluctuating public demand, and the difference between the summer and the winter's working time, cause many dismissals where no fault can be found.

To such men, then, we think the Photographers' Benevolent Association will be of the utmost value. For a trifling annual payment which could never be missed valuable assistance in a time of need may be secured, and that not as a gift or act of charity, which some would be ashamed to receive, but as a right which had been bought and paid for as much and as honestly as any commodity of daily consumption. That this may be done well, however, it is necessary that the membership of the Association should be extended to the utmost limit, and that the annual payments be promptly and regularly paid. Nor should the membership be confined to assistants or those likely to become recipients of its aid; everyone interested in the profession should lend a helping hand, keeping in mind that the less he is likely to need help the better able is he to promote the objects of the Association.

We especially commend the subject to the attention of employers throughout the country at this annual festive season of the year, when "peace and good will towards men" should be the Christian axiom of all classes of the community. They should always bear in mind that their interest and the interests of their assistants are identical, and that whatever tends to elevate the moral, intellectual, and social tone of the employed always exerts a powerful reflex action on the employer. To this end, then, they should first set the example by becoming members themselves, and then exercise their powers of persuasion to induce their assistants, both male and female, to follow the lead, and we are quite sure that, if at the end of another year we could say that the Photographers' Benevolent Association included in its membership every photographer and every photographers' assistant, it would tend very much to the benefit of all concerned.

EXPERIMENTS IN LIGHTING.

I have not as yet tried the "sciopticon" of which you speak, but it would undoubtedly be a great advantage if paraffine oil could be burnt in the magic lantern, and I cannot see why this should not be done by a lamp constructed on the duplex principle, with an oval glass and the oil reservoir *beneath* the lantern, so as to be out of the way of the heat. At present I am working with the solid paraffine, and have amused myself occasionally of an evening by trying a few experiments, the results of which I send you for the benefit of persons uninstructed in the art.

The first question I had to determine was what precautions were necessary to preserve the material in a fluid state. I therefore filled the lamp in the usual way, and placed it in the lantern with the flame turned to about *half* the full height; it burnt for a quarter of an hour and then went out. I next mixed the melted paraffine with an equal bulk of colza oil and repeated the experiment, but the result was the same—the contents of the reservoir became perfectly solid in spite of the oil.

Having decided that the lamp must be burned at full height I tried the effect of raising the wick a little above that point. It gave an excellent light, but gradually filled the room with a white and suffocating smoke; on opening the lantern door, however, there was no sooty deposit on the lamp glass, such as I have seen with sperm oil containing camphor. The white smoke of imperfectly-burned paraffine streamed out from the top of the chimney, and I have since then easily tested the height of the flame in that way without the trouble of opening the door. If the ascending current of hot air shows more than *a trace* of visible smoke the wick must be turned down.

My fourth experiment was made on a very frosty night and in a room without a fire. I melted the paraffine, taking care to keep its temperature as low as possible; it burnt well with the flame at the full height, but when I purposely opened and shut the door a few times, and moved the wick slightly up and down, it went out. Evidently, therefore, the keeping of the flame at the full height is not sufficient security in cold weather if the paraffine be barely at the melting point when it is poured into the lamp.

So far I had used a small earthenware teapot for melting the paraffine, but I now tried a common saucepan glazed with earthenware, and stirred it with a silver spoon over a naked fire; it melted rapidly, and after a few minutes began to give off vapour. I then put it into the lamp, turning on the flame to the full height, and it burnt well to the last drop. No amount of opening and shutting the door, or of interference with the wick, appeared to do any harm. This state of things, therefore, I think is safe, viz., paraffine heated considerably above the melting point before putting it into the lamp, and the flame kept at full height to maintain the temperature.

Some objection having been made to the process on the score of expense I put half-a-pound of melted paraffine into my lamp and burnt it down dry; it lasted rather more than two hours with the wick at the full height. As the best paraffine candles are sold in quantity at one shilling per pound, this gives not more than *sixpence* for an evening's entertainment; or *ninepence*, if the retail price of solid paraffine be taken at eighteenpence per pound.

The above experiments were all made with an argand fountain lamp of the size known as "No. 8" wick. This kind has the advantage of keeping the oil always at the one level, but the fact of the reservoir being above the flame, and also *behind the reflector*, is very much against it when solid paraffine is used. Messrs. Mawson and Swan, of Newcastle-on-Tyne, have shown me a lamp in which this objection is overcome. The shape is something like that of an office inkstand, and the lumps of paraffine are laid upon the top and allowed to melt down into the body of the lamp below. The heat of the flame passes by conduction to every part and preserves the fluidity.

In my next communication I will give you the results of some comparative experiments on the relative value of solid paraffine and camphorated oil as sources of light. In the meantime I must thank Mr. Howard for his short, but sensible, letter in your last number.

F. Hardwich.

ON THE PRINCIPLES AND PRACTICE OF THE GREAT PORTRAIT PAINTERS.

[A communication to the South London Photographic Society.]

If I had proposed only some seven or eight years since to read to a body of photographers a paper on the practice and principles of the great portrait painters it might have been asked, and with no little show of reason—"What have we to do with the practice of artists, whether great or small?" When photography first started into existence, but little more than thirty years ago, it was a something between chemistry and conjuring, and even now among the vulgar, who are ignorant of the means by which its effects are produced, it has still much of its ancient character. The great improvement in the character of photography, and especially of English photography, is generally ascribed to the exhibition of the works of Adam-Salomon, in the year 1867. As many of you have never had an opportunity of seeing these, our friend, Mr. Simpson, to whom we were indebted for their original exhibition, has kindly promised to show some of them tonight.

As photography progressed one discovery following upon another not only proved the practicability of the new art, but pointed to a not very distant future when it might proudly take its place by the side of the sister arts of painting and sculpture, or, as some of its votaries thought, displace them altogether. This rivalry with painting, and more especially with portrait painting, naturally produced an unpleasant feeling in the followers of the latter art, many of whom, and especially the weaker or younger members, like Othello, found their "occupation gone;" hence the origin of that apparent opposition between what are called the fine arts and this their younger sister—greatly, as I believe, to the detriment of both. Upon the whole, it is surprising that photography and painting, working side by side for so many years, have yet exercised so little influence upon each other. The artist still goes on making the studies for his pictures in the old laborious way, apparently ignorant or careless of the assistance photography might afford him, while the photographs of the present time, although still much in advance of those exhibited some few years since, yet appear (with some splendid exceptions) still wanting in those art qualities that raise the work of our hands from a dull copy of the commonplace in nature to what in the best sense of the word we understand by a "picture."

If I may be allowed the expression, too many of our photographs appear to be wanting in brains. The author has been content to allow the lens to think for him. That huge cyclopean eye sees things in many respects differently from the way in which they are presented to our double vision; much more does it differ from the eye of an artist. In the first place, our friend is colour-blind; it cannot distinguish yellow from black, or blue from white. Then it is utterly wanting in discrimination; it dwells upon the buttons on your coat, the pattern of your trousers, or the wrinkles in your boots, and depicts them all with the same mechanical exactness with which it shows the lines of thought in the face of the sage or the smile on the lips of beauty.

"If you want to find out the faults of your picture," said Benjamin West, "set a student to copy it; he is sure to find and exaggerate them." It is the same with the lens. With what remorseless severity it seeks out and displays those freckles almost invisible to the naked eye! How it turns the rosy cheeks of youth and health to blackness and heaviness, stealing at the same time all force or expression from the eyes that are inclined to blue or grey! Truly a blind leader for the blind! What has been said with respect to fire may be applied to the photographic lens—"it is a good servant, but a very bad master." It requires to be studied, to be humoured, and often to be corrected. And here it is that the artist-photographer has the advantage over his less enlightened brothers. Knowing well what ought to be the effect, he is not satisfied with the first view the lens may afford him, but strives by the disposition of his background, by casting the light upon one part or sinking another in shade, by skilfully disposing his draperies and accessories so as to form graceful lines, to reduce what was before a chaos to order and harmony. It is in the hope of affording some slight assistance in this direction that the following observations have been written.

And here I should like to bestow a few words of thanks on those masters of the photographic art who have so liberally contributed the results of their skill and experience to their less fortunate or more juvenile brethren. I think that we owe them a deep debt of gratitude, and I, for one, tender them my most hearty thanks. As it is chiefly the purpose of the present paper to establish a few of those art principles that may be most useful in our practice, I shall say no more upon the historical part of the question than may be necessary to a right understanding of their practice.

Portrait painting, as we understand it, was but little practised by the ancients. The Greeks, who excelled as artists all other nations, whether of ancient or modern times, when they wished to transmit their counterfeit presentment to posterity generally preferred the more enduring marble or bronze of the sculptor for the purpose. We are told, however, that Alexander the Great sat to Apelles, the greatest artist of antiquity, for a full-length portrait. As the Emperor had something the matter with one of his eyes the painter turned that eye to the wall. I suppose that it is scarcely necessary for me to commend this piece of ancient practice to your attention. Alexander certainly approved of it, for he presented the painter with a sum equal to about £50,000 of our money. It is also of Apelles, if I remember, that another story is told. Having exhibited a picture, exception was taken by a shoemaker to the way in which the sandal was tied; the painter altered it. This so elated the critic that he began to find fault with the anatomy of the foot. "Let the cobbler stick to his last!" exclaimed the indignant artist—a saying that has since passed into a proverb. It is recorded of another Greek artist that, having painted a picture in which some accessories (dead game, I believe) were greatly praised, he immediately painted them out, unwilling that they should distract the attention from the principal object. This was true art. It may be safely said that, whether in a painting or photograph, if any secondary object draw away the attention from the principal it had better be left out altogether. The Romans never excelled, either as painters or sculptors. All their great works were either carried off from Greece or executed for them by Greek artists.

We pass, then, to more modern times—to that gradual revival of the arts which took place in Europe during the middle ages. During the fourteenth and fifteenth centuries painting, both in Italy and Germany, but especially in the former, gradually emerged from the cloud of Gothic darkness that had long obscured the taste, design, and genius of art. In the sixteenth century painting in Italy attained to a height of glory and perfection unknown in any previous age or other clime, and which has been the envy and admiration of all succeeding times. We are now on firmer ground. The artists have long since returned to their kindred clay, but their genius still survives in their works. Early in the sixteenth century we find living and working together, or about the same time, those great masters whose names have become "familiar as household words" wherever taste and genius are appreciated. To quote the names of Leonardo da Vinci, Raphael, Michael Angelo, Corregio, and Titian is at once to conjure up in the mind of the artist or connoisseur the remembrance of those great representative men who, while giving to the art some grace or beauty unknown before, each in his turn impressed upon it the peculiar stamp of his own genius. They were all great inventors, and not one of them on his own peculiar ground has ever been equalled. Da Vinci, the earliest of these artists, in addition to his reputation as a painter, was also noted for his skill in sculpture, engineering, and mathematics. He has left many works or parts of works; and his *Treatise on Painting*, which has been translated into many languages, is still one of those books most read by artists. The picture he is now most noted for is the celebrated *Lord's Supper*, where the Saviour is seated at the table in the midst of his disciples. There is a small picture of Christ disputing with the doctors in our National Gallery.

Da Vinci, Raphael, and Michael Angelo all excelled in form. Da Vinci gave to the human figure a roundness and grace unknown before. He also greatly improved the *chiaroscuro*, or light and dark. His pictures are finished with extreme care, and the shadows have a particularly lucid effect. Raphael has often been called the "prince of painters," as he is allowed to unite more of the higher qualities of the art than any other. His drawing is free and masterly, and his draperies flowing and graceful. He is allowed to excel all others in expression and in the beauty of his female figures. It fortunately happens that we have in this country, and accessible to all, some of his noblest works. I refer to the famous cartoons now at South Kensington. Raphael did not paint many portraits, but there is much in his works that may be useful to aspiring photographers. Michael Angelo excelled in the sublime and terrible. If Raphael be the Shakspeare, then Michael Angelo may be styled the Milton, or, still better, the Dante, of painting. He had the extraordinary fortune to attain to the first place in three kindred arts. As a painter he produced the *Last Judgment*, which is generally allowed to be the sublimest picture of modern times. As a sculptor he is famous for the colossal figures of *David* and *Moses*, casts of both of which may be seen in the Museum at South Kensington. He was also the architect of St. Peter's, at Rome. Michael Angelo did not paint in oil, and never painted portraits; he must, therefore, be dismissed without further comment. Corregio, the next on our list, was particularly noted for grace; the softness and depth of his *chiaroscuro* serve to distinguish him from every other master. There are three of his pictures in our National Gallery, all of the finest quality—the *Ecce Homo*, the *Venus and Cupid*, and the charming little *Holy Family*, a perfect gem.

The last of those I have mentioned is Titian, the great head of the Venetian school, and acknowledged to be the greatest of all colourists. His portraits are magnificent. It is surprising to note how he who scattered the most brilliant colours through his historical works, till they seem all aglow, should yet, in his portraits, and especially in his male heads, generally exclude all strong colour. The accessories—always simple in Titian—although of the noblest character, are subdued; it is the head that fixes your attention. The figure, the costume, and the accessories are there when you look for them; but they are never allowed to divert your attention from the countenance. This is the more noticeable, as the costume of the time was at once elegant and dignified. So anxious, however, was Titian that nothing should divert the attention from the head, that he frequently covered the hands with a dark glove, in order not to have a second light in the picture. If you wish to see the heads of men grave, dignified, and full of thought, with the soul looking through the eyes, you must go to Titian. To quote the words of Shakspeare—

> "The very life is warm upon that lip,
> The fixture of the eye has motion in't,
> And we are mock'd by art."

Titian, though the greatest portrait painter of the Venetian, and perhaps I might say of any, school, was by no means the only one. The names of Giorgione, Paul Veronese, Sebastian del Piombo, Tintoretto, Pordinone, Bassano, and others at once recal to the mind of the artist heads full of glorious life—male faces of the most dignified type, and features of female loveliness, which, though wanting the refined and delicate beauty that Raphael or Corregio would have given them, yet smile from the canvas with all the glowing freshness of life and nature. The Italian school, besides leading the way through the paths of art, displayed an acknowledged power and variety not reached by any other of modern times.

The school of Spain has produced several artists of eminence, the principal of whom are Murillo (the Spanish Raphael) and Velasquez. Both these artists, in addition to their skill as *genre* or historical painters, excelled in portraits. Velasquez, especially, introduced a style that is still quite his own. His works are eminent for their great freedom of handling, for power, freshness, and a general look of nature—not possessing the thoughtful dignity of Titian's heads or the refined elegance of those of Vandyke, but startling by their vigour and truthfulness. There is only one portrait by this master in our National Gallery—a head of Philip IV.—but his characteristic excellences are well displayed in that.

The Flemish and Dutch schools are principally eminent for works to which we commonly apply the name of "*genre*" pictures—generally subjects of a rustic nature or taken from everyday life. The painters of these schools are generally noted for excellence of colour, skill in *chiaroscuro*, and knowledge of composition and the grouping of figures. They reduced the principles of the Italian schools to a regular system, and it is to their works that the artist generally goes to learn the principles and mechanical practice of his art. The heads of this school are Rubens (the "prince of painters," as he is sometimes called by his numerous admirers in opposition to the more refined and classical style of Raphael) and his pupil Vandyke. They are both noted for great mastery in the mechanical qualities of the art, were both great colourists, and painted pictures of the largest size, whether sacred, historical, landscape, or portrait. In the last especially they both excelled. The portraits of Rubens are painted with great force and freshness of colour. There is at Windsor Castle a room named after him the "Rubens Room," and filled with his works. There is also in the National Gallery a fine portrait of a woman in a straw hat, called the *Chapeau de Paille*, from the collection of the late Sir Robert Peel.

What I have said respecting the portraits of Rubens applies generally to the similar works of his pupil, Sir Anthony Vandyke. The latter, however, though generally having somewhat less force, are more graceful in their attitudes, while the faces have more refinement and subtlety of expression. Vandyke settled in this country, and was appointed Court painter to Charles I., whose features he has transmitted to us upon so many canvasses. Like his master Rubens, there is at Windsor Castle a room filled with his works, all portraits of the great and noble of the time, and that room is known by his name. The noble head of an old man in our National Gallery, called *Gevartins*, has been ascribed to both these eminent painters. Barry remarks of this artist:—"Happily the works of Vandyke are not scarce in this country, and in them you will see admirable examples of what has been urged respecting the beautiful arrangement of light and colours united to all the graces of intelligent, masterly execution, and his style is much more correct and beautiful than that of Rubens." Before leaving the Hague there is another great portrait painter to whom I can do little more than allude, although his works are of the very highest class—I mean Rembrandt. To give any sufficient idea of his works would require a paper in itself. The common idea among photographers respecting this great master is that he always turned his sitters with their backs to the window, and represented them with black faces having a streak of white running down the nose. Truly a comical idea of the painter! I suppose I must have seen 200 or 300 portraits by his hand, but never happened to come across one of these streaky Rembrandts. He was noted for the great force and brilliancy of his lights, which were generally obtained by concentrating the light (very often he has only one) upon one part and surrounding it by masses of dark shadow, often bordering upon blackness, but never black. After these foreign masters, if such they be—for I hold with Voltaire that "*ceux qui aiment les arts sont tous con-citoyens*" (those who love the arts are all fellow-citizens)—after these, however, we may very well devote a few lines to the portrait painters of our own school.

The greatest of these were undoubtedly Sir Joshua Reynolds and Gainsborough, the latter of whom was equally noted for his skill and originality as a landscape painter. Sir Joshua Reynolds has been surpassed in his male heads, but his women are, to my thinking, unequalled. There is about them a feeling of grace and beauty united to a power and easy mastery in the execution that places them at the very head of their kind. I can only mention a few of the finest. Amongst these may be enumerated the picture of the three *Misses Waldegrave*, the famous and charming *Nelly O'Brien*, who is seated in a rich landscape with the shade of a large hat thrown over the upper part of her beautiful face, the celebrated portrait of the *Duchess of Devonshire* holding up her child, his picture of *Mrs. Siddons* enthroned in the clouds as the tragic muse, and the picture of another great actor, *Garrick between Tragedy and Comedy*. The pencil of Reynolds ennobled all it touched. However vulgar or commonplace his sitters might be they always appear upon his canvas as ladies and gentlemen. "*Nihil tetigit quod non ornavit.*" Gainsborough is noted for the great force and freshness of his portraits and the masterly ease of their execution. He studied Rembrandt and Vandyke with great success. There are three very fine examples of Gainsborough's portraits in the National Gallery—*Dr. Schomberg*, *Mrs. Siddons*, and a masterly rendering of an ordinary head, called *A Parish Clerk*. The limits of a paper like this will only allow me to mention the names of the remaining artists of the English school who have best succeeded in portraiture. They are Romney, Sir T. Lawrence, Jackson, and Raeburn, called the "Scotch Velasquez."

I will now endeavour to extract from the works of the great painters I have named some principles that may be of service to us as photographers. The first and most important principle that indeed guides and regulates the whole is that of sacrifice. The parts must be sacrificed to the effect of the whole. If a number of objects strike the eye at the same time, and are possessed of equal force, they naturally compete with each other, and thus weaken the effect of the subject. The principle is thus expressed in Dufresnoy's *Art of Painting*:—

> "Yet if some grand, important theme demand
> Of many needful forms a busy band,
> Judgment will so the several groups unite
> That one compacted whole should meet the sight."

This is confirmed by a note of Sir J. Reynolds's. As the head is the most important part of the portrait, so it should first attract the attention. In the best works of the best men the principal light always falls upon the face; and, where necessary, all other parts are subdued so as to concentrate the attention upon it. Painters who work with much less light than is found convenient in photography always light the head from above, and it is held most conducive to effect that the light should be small. Rembrandt—who is supposed to have derived his first ideas of the striking power of a ray of light in the midst of a mass of shade from the effects he had observed in the interior of his father's mill—has often carried this brilliant contrast to the extreme, so as to show scarcely anything but the head. Northcote, also, in describing the studio of Sir J. Reynolds, tells us that it was lighted by a single window eighteen inches square, the lowest part of which was about ten feet from the ground. Sir J. Reynolds, again, when speaking of the early painters who obtained relief for their heads by bringing the light part of the background against the dark part of the head, and *vice versâ*, recommends the contrary practice of Titian, who often relieved the darks of his heads by a still darker ground, thus giving an appearance of great breadth. This plan is in advance of our present photographic practice.

One most important feature of the face is certainly the eye. All the masters I have mentioned succeeded in giving great expression to the eyes—the "windows of the soul"—while, unfortunately, in every large photographic head this has been the weak point. I do not remember one in which this important feature has been perfectly satisfactory. It is also of great importance in lighting the head to place it so that the eye shall be in shade, or at least in half-tint. The next important feature is the mouth. Generally the corners are turned slightly up, which gives a pleased and pleasing expression; if the corners of the mouth are drawn down the face is sure to wear a look of pain.

Thus much for the head, to which, as I have previously observed, it has been a rule among painters that the figure should be subordinated. How far this principle of sacrificing a part to the effect of the whole is to be carried must depend upon the taste of the artist, whether he be painter or photographer. Titian and Rembrandt in some of their works carried the idea so far that little besides the head is to be seen; while, on the contrary, Rubens and Vandyke, whose portraits have more the look of ordinary daylight, allow greater prominence to the figure. The principles I have laid down have not been much followed by photographers; still there are brilliant exceptions. As I have observed, Adam-Salomon was one of the first to apply the recognised principles of art to photography. In this he has been most successfully followed, and I think excelled, especially in size and the consequently-increased importance of the figure, by our exellent member, Mr. Valentine Blanchard. I will pass round three of his studies, and will just call your attention to the way in which the subordinate parts are sacrificed to the effect of the whole—to the brilliancy of the lights and the depth and gradation of the shadows—in this respect following the principles which I have pointed out as characteristic of many of the great masters, and carried out to the fullest extent by Rembrandt. I have also brought a few specimens of large heads by Mr. Robert Crawshay, whom I look upon as the greatest in this style of photography. You will see from the way they are signed that he disdains in any way to shelter himself or his works under the name of an "amateur;" and I know no professional photographer with so large and lofty an aim who has less to dread from hostile criticism.

Some of you will probably remember a paper I read at the commencement of the year on the difficulties of taking large heads. I objected to the size given, as being greater than that of nature. Mr. Crawshay, who reduced the size, kindly wrote to me, stating that my arguments had convinced him and induced him to make the alteration for the present year, at the same time pressing me again to compete. A death in my family prevented me complying with this wish; nevertheless, I gladly take this opportunity to thank him, and I think many of you will join with me, not only for his compliance in this respect, but for the large and liberal spirit of art that caused him to offer his handsome prizes for competition. Size, in photography, is a very important element in the consideration of the subject, especially where the great mass of photographers have their attention devoted to the production of *cartes* or other small negatives, which, however profitable to their authors, are almost beneath consideration as works of art. They may be gems; but even a diamond, the most precious of all gems, may be so small as to be almost valueless. It is because the Crawshay competition has helped to counteract this, as well as from the example of the donor, that I look upon it as an era in the art.

In reading a paper on the practice of the great painters to exhibit specimens of photographs is very suggestive of the pedant who wished to dispose of his house, and carried a brick in his pocket to give an idea of the building. In my case it is even more unfortunate, for it is a brick from another house. That house, however, is the good one of photography which we all love so well, and this must be my excuse for showing them. R. W. Aldridge.

A VISIT TO THE STUDIO OF M. ADAM-SALOMON.

In the hope of finding something useful and instructive for your readers I made, a few days since, a visit to the studio of M. Adam-Salomon, the well-known sculptor and photographic artist. His studio is situated in the most aristocratic part of Paris, near the Bois de Boulogne—the Hyde Park and Rotton Row of that city. On entering the garden through which you pass to the artist's pretty villa the first impression received is in favour of the æsthetic character of its inhabitants, for refined taste is displayed in the arrangement even of the flowers and shrubs, and one feels, as it were, pleased, while overawed, by the invisible genius which presides over the place.

I was received with great affability by Monsieur and Madame Adam-Salomon. The latter, to put me at ease, said—"You are welcome to our dwelling as correspondent of The British Journal of Photography; but you yourself are by no means a stranger to us, for we employ your books in the education of our son." The ice being thus broken, M. Salomon conducted me into his gallery, or, rather, winter garden, of sculpture and photography; for the gallery is full of plants and shrubs of every description—the marble busts of great men, as it were, peeping out of the foliage, surrounded by everlasting verdure. To mention all the beauties of the gallery would require a volume. I will only name rapidly a few of the most remarkable. A lifelike bust of Guizot; another of the Duc de Broglie *(ancien ministre de Louis Philippe)*; Lesseps looking at Ponsard; Cochen, the moralist, turning his back to Rayer, doctor of Napoleon III.; Halévy smiling at Odillon Barrot; two bas-reliefs, *chefs d'œuvre*—one of a young lady, the other of the celebrated Charlotte Corday; a magnificent bust of a Russian banker in close proximity to a bust of the Empress Eugenie, modelled at the age of fifteen years. In the centre of the gallery were two reclining life-size figures—one of the Princess Ponslowka and the other of Madame Kahn, of Vienna, intended for a hotel in Paris where she died. In the attitude of that calm image, in that placid forehead, and on those cheeks which had so often received the proofs of friendship and love, in all that marble in which the inspiration of the artist had revealed the majesty and mystery of death, and on which the chisel had created an ineffaceable softness—everything spoke of immortality. M. Adam-Salomon has here shown death—not in its horror, but in its ideal; he has become master of the subject, and, at the same time, remained an intelligent and faithful disciple of nature. He has not striven to dissipate the sadness of death; but he has, as it were, hidden its pangs. Here might truly be said—"*Ars est celare artem.*"

Several busts of Englishmen adorn the gallery; but what surprised me most was the great number of portraits of our aristocratic families. Really I could imagine that I was in a studio at the west end of London, and not upon the continent. The same artistic skill is visible in M. Salomon's portraits as in his statuary. He throws the light of his genius into his photographic operations. Every portrait is a picture in which one can see that the artist had studied the details from one extremity to the other.

M. Salomon then conducted me into a new building which he has had constructed at the back of his villa, in the centre of his garden. The first story is consecrated to sculpture. Many workmen were employed roughing out the marble, modelling, making plastic figures, &c. On the same story is his dark room or laboratory. The second story is devoted to his photographic studio, and a bridge connects it with his abode. The studio is spacious, light, and airy. A very large semicircular background holds a most prominent position. M. Salomon then pointed out to me the effects of shade he could produce by movable shutters or folding screens hung by means of hinges on its sides.

The whole of the northern side of the studio is glazed to within a foot from the floor. On the southern side is an alcove about two yards and a-half square, glazed on the top and the two sides. The background is formed by a splendid plate of ground glass in one piece (whole plate?). M. Salomon said this alcove was a new idea.

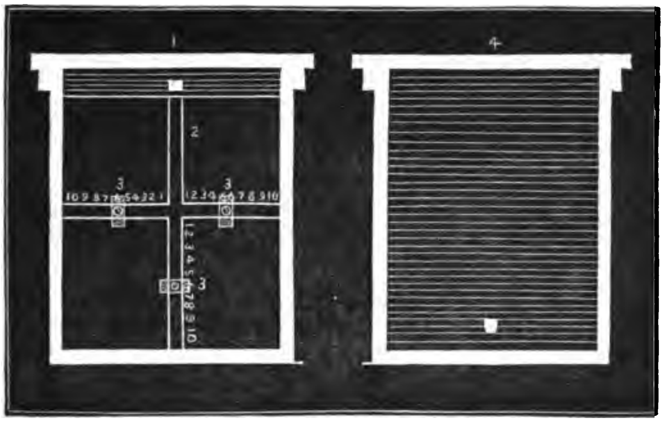
Every photographer has experienced the difficulty in taking the portrait of a lady dressed in a ball or wedding dress. The face is that of a mulatto, and the dress snow white, without shades and without harmony. This state of things M. Salomon has endeavoured to change. He poses his model quite close to the ground-glass background. The light of the northern side of the studio, together with that of the top or ceiling of the alcove, falls on the face of the model. This light can be diminished on either side, by means of curtains, at the will of the operator. Let us suppose that a young lady, attired in a white tarlatan dress, desires her portrait. She is placed in the alcove with her back towards the ground-glass background. The operator has to occupy himself only with the figure of the model in order to give the proper half-tones; he does not want to touch the dress to give the proper effect. The glass is exposed, and every fold is seen in the negative to perfection.

I will endeavour to describe how this is done. There are few persons who have not seen those German porcelain or chinaware pictures which we hang sometimes in our windows. The lights and shades are formed by the thinness or the thickness of the porcelain in its different parts. As it is with the porcelain picture so it is with the folds of the dress. When the tarlatan is of a single thickness the light penetrates easily; when double, it goes through it with more difficulty. Thus is formed the lights and shades in the drapery. The idea is very good, but it must be worked up; for, although the shades in the dresses of the portraits shown to me done after that system were magnificent, and, no doubt, of great value to the painter and sculptor, I am in duty bound to say that I found the figure's visage wanting in both tone and expression; the artist has been carried away here by his love for modelling, and has fallen into the opposite error, which, I am sure, can be easily corrected.

In one of the corners is a very ingenious apparatus, composed of a movable box, with a pulley employed to carry up to the second floor the prepared plate from the dark room, situated on the first floor—"for," said M. Salomon, "I permit no one to be in my studio while the model is sitting."

M. Salomon employs a dark slide which is very ingenious. A description, I think, will be welcome to your numerous readers, who, if the slide be not already known, will find great advantage in its use. It is for a plate sixteen inches square; if he wish to employ a smaller plate, by the use of a very simple contrivance he does not require a set of frames of different sizes.

No. 1 is a model of the dark slide, with a patent Gilles's* shutter—



the latter pushed up to show the interior. No. 2 is a groove placed crossways, and divided into inches or parts of an inch, in which slides easily three pieces of square wood or ivory No. 3. The sides looking towards the centre are cut at an angle, in order to hold the plate firmly. The pieces of wood are themeselves held to the groove by means of a screw, the head of which slides up and down the groove, carrying with it the piece of wood.

Let us suppose that a plate 8 × 8 is required for a portrait; the operator undoes the head of the three screws, advances the three pieces of wood to four inches on the measure, tightens the three screws, places the plate (the collodionised surface towards him), pulls down the patent shutter (see diagram No. 4), and the plate is ready to be exposed.

Our conversation then turned upon the fixation of colours in the camera. M. Ducos du Hauron, he said, was about to become associated with him in carrying out his process in a commercial point of view. He (M. Salomon) was at one time very sanguine as to the results, but now saw that it was impossible without a chemical re-agent was discovered more powerful than any at present at their disposal.

M. Salomon then lead me through several other *ateliers*, in one of which I noticed a superb reclining statue overshadowed by the wings of an angel standing at its head. He informed me it was Lamartine, intended for the Chateau de St. Point.

He then showed me a new invention for taking a cast of a person whether living or dead, instead of employing the primitive method of plaster of Paris. The apparatus is a large, oval, iron receptacle six inches deep, in the surface of which is bored an immense number of small holes, in which slide pieces of steel wire about five inches long, resembling knitting-needles. When all these needles are in their place the surface is quite level; but if a handle be pushed at the back of the machine all these needles advance about four inches from the surface, and present the appearance of a very large brush. To take the cast or form of a human face the apparatus is hung up, and the person advances and pushes his or her head into this sort of brush; naturally, the nose and other prominent parts of the figure push in, more or less, the needles, and leave exactly the shape of the head. But the needles are movable, and must be fixed in order to take the model. This is done in a very ingenious manner. The iron box is filled with tallow, the box or apparatus is warmed before the person pushes in his or her face, and all the needles slide through the grease with great ease. The apparatus is then left to cool, the tallow becomes hard, and naturally the needles remain firm. The form left is then copied either in fine clay or in plaster of Paris.

I see only one objection to its use. The smell of the tallow might make a handsome lady hesitate before she offered her face to such a machine. In order to persuade her, perhaps the aid of Mr. Rimmel would have to be invoked.

I then took leave of M. Adam-Salomon, charmed with my visit.

E. Stebbing, *Prof.*

ACCESSORY EXPOSURE OF THE SENSITIVE PLATE.

[A communication to the Manchester Photographic Society

So long as babies continue to vex the spirit of the photographer it is probable that that perplexed and much-enduring individual will be interested in anything offering a possibility of shortening the camera exposure. Indeed, even for others than restless juveniles the shorter the exposure the better, if other things remain equal. Hence nostrums and quackeries innumerable have been offered, and much legitimate effort has been put forth, in connection with the chemical, optical, and mechanical departments of our art-science, to obtain this desirable consummation.

One of the latest claimants for popular favour (though not entirely new) is found in allowing actinic light in some form to impinge upon the plate either as a pre- or post-exposure, or in some cases simultaneously with the action of the picture on the plate. Many of the ways suggested of applying this extra light, however, are unmanageable in their nature and variable in their results; hence it is not surprising that some difference of opinion as to their efficiency at all should exist. For instance, it might be anticipated that by the use of opal glass before the lens the amount of light transmitted would much depend upon the angular relations of the lens to the window. If the instrument were pointed away from the light little would enter the camera, whereas if turned more towards the windows the effect would rapidly increase; hence a variable result would accrue even with an exposure apparently similar. In practice this was found to be the case. Although the result in one instance might be excellent, the next plate would, perhaps, be fogged. It was impossible to be sure of the maximum good effect without sometimes going too far. The use of a gas jet in the dark room was thought of with more promise of certainty. As, however, gas is a variable product, and the pressure frequently altered, a more uniform source is desirable. No great step is needed to find one in the standard by which the illuminating power of gas itself is measured. A sperm or wax candle will give all that is required. It is *handy*, *definite*, and not over-expensive. The kind which chanced to be tried by the writer is known as "Price's Ceylon wax."

An uniform source of light obtained, it remains to test how many seconds' exposure the plate will bear without danger of fog. A few experiments showed that in my dark room ten seconds' exposure at a distance of three feet gave the maximum of good effect. I apprehend that in other rooms the amount would vary with the amount of actinic light already present there, as, probably, no dark rooms are actually "dark" in the absolute sense.

Some discrepancy exists in the accounts of the benefit derived by an accessory exposure. Some claim for it as great a reduction as one-half or even three-fourths of the whole. I am not inclined to be so sanguine. A reduction of from twenty-five to thirty-five per cent. seems nearer the mark, perhaps; but such a saving in time is not to be despised when a group of youngsters, graduating from one year upwards, have to be taken on a November afternoon.

The question of a *pre-* or *post*-exposure is one with which the writer has not much troubled himself, being generally content with the *former*. In one or two comparative experiments, however, made to test this matter the preponderance was very considerably in favour of the *pre*-exposure. It is common enough at a railway station to see six or eight men engaged in starting a truck they wish to to move; once started, however, two or three of those same men will easily suffice to propel it. Again: various seeds are soaked in water before being sown, in order to start them growing more quickly. Indeed, throughout nature a portion of force is spent in overcoming inertia before the continuance of that force can be utilised. It is probable this is the explanation of the utility of a pre-exposure of the sensitive plate.

One or two considerations should be borne in mind by experimentalists in this direction. With a bath over-worked, surcharged with ether and alcohol, and already giving flat results bordering on fog, it is not likely that much good result will be found. Again: in portraiture, where softness, delicacy, and half-tone are desiderated, the use of accessory light is far more indicated than in reproductions or copies of "still life," where vigour of high light and firmness of shadow are looked for. Like all other powers it should be used with judgment, and with reference to the effect desired to be produced.

Benjamin Wyles.

FOREIGN NOTES AND NEWS.

M. Lambert's New Carbon Process.—Professor Vylder and M. Maes on Carbon Printing.—Poirier's New Press.—Photographic Society of Vienna.—Forthcoming International Photographic Exhibition at Vienna.

A report is current amongst photographers in Paris to the effect that M. Lambert—author of the "Lambertype" process of enlargement—has just perfected a new mode of printing in carbon which

* M. Gilles, or, rather, his former partner, M. Besson, was the inventor of the shutter.

is so extremely simple hat, in the opinion of its author and others, it must supersede to a great extent printing with the salts of silver. It is also affirmed that some licenses have already been granted for practising this process, and that the licensees are greatly pleased with their bargain. Whether this new carbon process is that advertised by M. Liébert (M. Lambert's agent) under the title of "*chromotypie*" we are at present unable to say; but, if so, the licenses for this process cost 500 francs (£20). M. Lambert-Sarony is now visiting the principal cities of Europe with specimens, &c. "*Chromotypie*" is advertised as yielding results which are more beautiful than silver prints; but whether the term is applied to prints in many colours or in only one pigment we cannot say. In short, there seems just now to be a *furore* on the continent for collotypic, Woodburytype, and carbon prints, and to say a word against any of these processes, and in favour of silver printing, is certain to bring a storm of indignation about one's ears. The unlucky editor of the *Echo du Parlement*—a journal published in Brussels—happened to make the following remarks in his number for September 18 of the present year, when reviewing the *Exposition des Arts Industriels* in that city:—

"We can only notice briefly photography in carbon. This process, which has now been in operation for more than ten years, and to which a special value is attached as yielding permanent proofs—a doubtful point, which is disputed by the most competent judges—has no other advantage than that of being complicated, and of increasing materially the cost of the proofs. For this reason the process has been abandoned by most intelligent photographers, who regard it as only destined to amuse amateurs, like *potichomanie*, lithochromy," &c.

Imagine the storm of indignation with which such a paragraph as the above must have been received by the devotees of carbon printing in Belgium. M. G. de Vylder, President of the *Association Belge de Photographie*, and editor of the *Bulletin*—who is also professor of photography at the *Ecole Industrielle* at Ghent—at once replied in a letter, which, however, the editor of the *Echo du Parlement* declined to insert. In this indignant protest in favour of carbon printing M. de Vylder says that the writer of the objectionable paragraph which we have quoted makes as many blunders as there are words in it. He denies that anyone conversant with the subject doubts the permanency of carbon prints; he affirms that the process is quite practicable and simple, and in proof of it points to the numerous large establishments where it is successfully carried on in England, France, and Germany; and he begs of the traducer of this fine process to go and visit the studios of MM. De Ron, Géruzet, Maes, and others. He concludes by beseeching the editor of the *Echo*, in the event of his publishing in a pamphlet the complete series of his reviews of the "*Exposition*," to suppress the objectionable paragraph in question. But of all this, as we said before, that editor has deigned to take no notice at all. He has neither acknowledged the receipt of the letter in his replies to correspondents nor has he inserted it in his columns. Even our own great "*Jupiter Tonans*" could not have treated a truthful and honest protest against any of its statements with more contempt.

Since M. de Vylder is the editor of the monthly *Bulletin* of the *Association Belge de Photographie*, it will readily be believed that that journal is becoming the spirited champion of all the new and good methods of printing photographs in fatty ink, coloured gelatine, and pigmented tissue. Its last number contains a long article by M. Maes, of Antwerp, on carbon printing. We have already stated (see last week's *Foreign Notes and News*) that this gentleman was the printer of the illustration in carbon which forms the frontispiece of the third number of that journal. It is a very successful specimen, and he is evidently a perfect master of the process, which he describes. He begins by giving a *résumé* of its history, in which we regret to see that a great deal of credit is given to Poitevin, and but little to our own countryman, Pouncy, who, whatever may have been the faults and errors of principle of his original process, was certainly the man who set the stone rolling, and by his specimens put others on the track. This is frankly admitted in the autotype *Manual*, and the fact should not be ignored by continental writers. It is to Mungo Ponton, Pouncy, Blair, Swan, and Johnson that we mainly owe carbon printing, rather than to any continental discoverers. But M. Maes certainly does full credit to Messrs. Swan and Johnson—particularly the latter, whose process of double-transfer he strongly recommends when the simpler method of single transfer cannot readily be employed. The article concludes with the following strong remarks, which, our readers must remember, come from the pen of a thoroughly practical man, and a leading professional portraitist:—

"We even think that it is no longer allowable for any photographic artist worthy of the name to produce and send out silver prints when he is working in earnest commercially. The two systems of carbon printing, by single and double transfer, meet all requirements. In both cases the proofs are of absolute permanency, the substances and products employed not being open to any of the objections to silver prints. The image is formed, not of soluble gelatine, but of gelatine combined with a certain base; it is, therefore, insoluble, even in boiling water. The cost of plant is but small, and the different operations can be conducted within a space of a few square feet. Let us, therefore, hope that our colleagues will set to work resolutely, and advance towards the goal which we all hope to reach, viz., to produce permanent proofs of the greatest possible beauty. Let them steadily pursue the road towards permanency, and we predict for them honour and profit."

M. Poirier—whose name is well known amongst continental photographers as a skilful manufacturer of the various forms of press used in their art—has just brought out a new press for printing photographs in fatty ink. M. Moock, who uses it daily, speaks highly of its performance. It measures about three feet six inches in length, and is said to work so smoothly and easily that a child could use it.

The recent meeting of the Photographic Society of Vienna was not very fruitful in matters of photographic interest beyond the pale of its own members. Announcements were made as to prizes which are to be offered for "nature studies," and suchlike, which we need not particularise here. In a rather confidently-worded letter Dr. van Monckhoven had written to the Society recommending his new wonder-working nostrum for developing pictures in a magical manner, and twenty bottles of the preparation were distributed at the meeting by his agent for the purpose of being tested. We have not any intention of crying down Dr. van Monckhoven's invention, but, at the same time, this method of dealing in secrets is one which has worked such harm to photographers that we cannot but regret that a man of his eminence should even seem to lend himself to the practice. No details are given as to the nature of the preparation which would enable anyone to make it, but more details are to be published by and by. When we see these we will also relate what the developer is supposed to perform.

It is announced that an international photographic exhibition is to be held next year at Vienna. Rooms in the Museum for Art and Industry are to be devoted to the display, which is to be opened in April. Members of the Vienna Society, and of all foreign societies, who have photographs or apparatus to exhibit, are eligible; and whoever intends to contribute must forward their articles and pictures so that they may reach Dr. Hornig by the 15th of February next. His address is No. 9, III. Hauptstrasse, Vienna. In the main the usual regulations must be observed as to the sending and returning of consignments. Awards are to be given by a selected jury, and silver medals are to be given only in cases of surpassing excellence of artistic qualities. All objects not disposed of must be withdrawn from the rooms within eight days after the closing of the exhibition.

A SUGGESTION.

[A communication to the South London Photographic Society.]

You may think it a strange suggestion I have to make this evening. If it be carried out I think it will be the means of creating a greater interest in the meetings of photographic societies, and may, perhaps, be the means of having them better attended, and, at the same time, will be a connecting link between the photographic societies throughout the world wherever photography has established itself; and I think the South London Photographic Society a very suitable one to introduce the matter to the notice of other societies, both at home and abroad.

It is this:—To establish an exchange of photographic portraits (*carte* size, I think, would be most suitable) between the various photographic societies, in the first place, of all the office-bearers of the societies and of other notabilities who have rendered valuable aid in the advancement of our art-science; such gentlemen, I may mention, as Mr. M. Carey Lea, the Revs. Canon Beechey and F. Hardwich, Mr. Thomas Sutton, and many others, not forgetting our worthy editors. I am sure no one would object to contribute to a society's album provided and kept for that purpose, to be placed on the table each meeting night for the inspection of members. I think myself that if such a system were adopted it would prove of very great interest indeed to both amateur and professional photographers, and it would give greater interest to articles written when all of us would be able to see the portraits of the authors at our societies. There are scores of gentlemen whom we have only heard of by reading, and if we cannot see them to know them personally it will, I think, be a step in advance to see their faces in the way I have stated. I am sure no society would object to further such an object. It would also enable many of us to recognise gentlemen who attend our annual technical meeting, whose acquaintance many of us would like to make, and only know of their presence by seeing their names on the visitors' book.

I should be most happy to render any service in putting this suggestion in force. Should it meet your approbation the new year, I think, would be a very suitable period for its introduction.

WILLIAM BROOKS.

GERMAN CORRESPONDENCE.*

BECQUEREL'S RESEARCHES ON THE ACTION OF PIGMENTS ON THE SENSITIVENESS OF THE SALTS OF SILVER.—EXCITING AND CONTINUING RAYS.—ABOUT THE DIFFERENT ACTION OF THE SENSITISERS ON THE VARIOUS SILVER SALTS.—THE ALCOHOL ALKALINE DEVELOPER.—THE PERMANGANATE INTENSIFIER.

WHEN I published my observations on the action of pigments on the sensitiveness of bromide of silver my experiments were repeated in different quarters, but without result. I have ins everal instances demonstrated the cause of failure, still there remained doubters who absolutely refused to believe that bromide of silver can be made sensitive for yellow and red light. These doubters will, no doubt, hear with much interest that Becquerel in Paris has repeated my experiments with *perfect success*. Besides the colouring materials which I employed he has also tried chlorophyll, and this material shows a very great sensitiveness for red. I must here remark that Becquerel talks of his so-called "continuing" rays. Formerly he made a distinction between exciting and continuing rays, and maintained that the latter, *i.e.*, the yellow and red rays, might continue the action produced by blue rays. You are aware that, based on this supposition, it has been tried a hundred times to shorten the time of exposure by continuing the illumination with yellow and red light. The theory sounded very well, but practice has demonstrated that the whole is based on an illusion; and if any results were obtained by an after illumination it was due to the fact that the yellow and red rays had an admixture of blue and violet. Becquerel declares now himself that with wet plates a continuous action only appears under certain conditions, which so far could not be definitely determined. Only with dry plates is this phenomenon clearly visible.

The sensitiveness which, according to my experiments with pigments, is given to bromide of silver M. Becquerel explains by stating that by the first exposure the colour of bromide and chloride of silver is changed, and in this way the power of absorption for yellow light is produced. It is a pity that this publication did not appear sooner, as it would have saved to the practical photographer much valuable time spent in experiments.

Recently I have again commenced to make experiments with sensitisers, and obtained rather curious results. We know that the sensitiveness of iodide of silver is materially increased if bodies be present which can bind iodine chemically—for instance, nitrate of silver, tannin, pyrogallic acid, and morphia. One should think that the same substances would exercise a similar effect on bromide of silver, but this is not the case. Nitrate of silver increases the sensitiveness of bromide of silver considerably, but morphia and pyrogallic acid exercise no influence. It follows, from the above, that these preservatives affect bromide of silver dry plates differently from iodide of silver dry plates, and I have, in fact, prepared bromide of silver dry plates which, without a coating, were as sensitive as those prepared with the coating recommended by Wortley. This variable affection for sensitisers extends also to chloride of silver. So, for instance, is bromide of silver made sensitive for yellow light by the addition of aniline red, while chloride of silver is but slightly affected by the addition of this substance, which manifests itself only after a long exposure.

This variable behaviour of the different salts is probably due to physical causes instead of chemical ones. Further experiments will elucidate these points.

While making my experiments with different pigments I often made use of dry plates. I prepared these always in the ordinary way with bromine collodion and the nitrate bath. The development I made always alkaline. Generally the alkaline developer does not give as clean a plate as the acid. Lately I observed that the alkaline developer works much cleaner if alcohol be used in place of water. You know that the plate is moistened with alcohol previous to developing it, and in order to make the developer flow evenly (which consists of pyrogallic, ammonia, a bromine salt, and water), the plate has to be washed with water. To avoid this latter operation I made an alcoholic developer, which can be poured on without washing. This developer came fully up to my expectations. It developes much slower than the watery solution and very clean, and I was enabled to reduce the quantity of bromine salt considerably, and increase the proportion of pyrogallic materially, without being troubled with fog. The more I decreased the amount of alcohol the more rapidly did the picture appear. It is curious that the film adheres very strongly to the plate when the alcoholic developer has been used, while generally it easily leaves the plate when an alkaline developer is employed. I develope in the following manner:—

a.	Alcohol	80 cubic centimetres.
	Water	10 ,, ,,
	Ammonia	10 ,, ,,
b.	Pyrogallic acid	10 grammes.
	Alcohol	100 ,,
c.	Bromide of ammonia	4 ,,
	Water	20 ,,

Eight cubic centimetres *a* are mixed with six to twenty-four drops of *b* and two drops *c* and poured over the plate, which has previously been moistened with alcohol. If the picture appear too slowly the quantity of pyrogallic and ammonia may be increased, and it will not appear too rapidly unless the plate be very much over-exposed; but even then there is ample time to wash off the developer with alcohol, and to use a mixture containing less pyrogallic.

For intensification, eight cubic centimetres of ammonia and 6-20 drops of pyrogallic were used; bromide of ammonia is not necessary. If in formula *a* the water be left out entirely, and only absolute alcohol be used mixed with ammonia, no bromide is necessary unless the plate be much over-exposed. If a rapid development be desired, the quantity of water in *a* may be increased; but the slow development is a great advantage, as the picture is under much better control than with the watery developer. It sometimes happens with the watery developer that an over-exposed plate is treated with too much pyrogallic or too little bromine, and in this way gets spoiled, because it is difficult to stop the development. With the alcoholic developer this does not happen; and if a plate should be under-exposed, and developed with insufficient detail, the alcoholic developer may be washed off and the watery one taken in its place.

The slower action of the alcoholic developer depends probably on the fact that the alcohol retards the oxidation of the pyrogallic acid. It is well known that pyrogallic in a watery solution turns brown quickly, while dissolved in alcohol it will keep for years without spoiling. This retarding influence of the alcohol manifests itself also in the development; the solubitity of the nitrate of silver exercises a further influence. A slight quantity of nitrate of silver is present in the dry plates, and this quantity would be dissolved and cause fog with the alkaline development if no bromine were present, which converts the nitrate at once into bromide of silver. In alcohol the nitrate dissolves much more slowly, and therefore the danger of fogging is, with an alcoholic developer, even when very little bromine is present, very slight.

I noticed in the English journals that some learned readers state that my remarks about intensifying with permanganate, as described in your September number, is nothing new.

I fully agree with these critics, but must observe that I never claimed novelty for this process, but only intended to call attention to this but little practised and but little known method of intensification, which for reproductions offers decided advantages.

A want of permanence I have never noticed in plates intensified with permanganate. Some of them I have kept now for six months; and our mutual friend Simpson declares in his excellent periodical—"We have not found any lack of permanence in such negatives." Concerning the origin of this process, I have to remark that Herr Grüne, of this city, was the first one to practise it, and he published his method about nine years ago.

H. VOGEL.

* From *Phil. Phot.*

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual meeting was held on Thursday, the 17th inst., —Mr. T. S. Davis in the chair.

The following new members were admitted:—Messrs. Wratten, Skinner, Samuel Fry, and T. Wainwright.

The reports of the Committee and Treasurer, as follow, were read and adopted:—

ANNUAL REPORT.

YOUR Committee, in presenting their report for the session of 1874, most heartily congratulate your Society upon the healthy vitality and consequent strength which have characterised its existence during the past year. In addition to a very large increase of members, whom it is confidently anticipated will render valuable assistance to its proceedings, the past session has brought the South London Photographic Society prominently before the photographic world in maintaining itself as the medium of what is new, instructive, and thoughtful.

The institution of a technical exhibition, which your Society inaugurated, has this session been brought under the control of regulations which have placed it upon a firm basis, and which, in future, will make this meeting exceedingly useful and attractive. The ordinary meetings have been attended by a very large percentage of members, and great interest and animated discussions have shown the value of the subject matter brought before the Society.

Your Committee have to acknowledge their indebtedness to the Society of Arts for so kindly placing one of their rooms at the disposal of your Society for its ordinary meetings.

The following papers have been read during the session, viz.:—*On the Best Way to Make Enlargements*, by B. J. Edwards; *My Troubles in Taking Direct Large Heads*, by R.W. Aldridge; *My Experience in Taking Direct Large Heads*, by H. Garrett Cocking; *On Studios*, by S. Fry; *On Various Colouring Matters Suitable for Tinting Films*, by J. Spiller; *On an Apparatus for Reducing Silver Wastes*, by J. Bashford; *On a Method of Producing Large Composition Groups*, by B. J. Edwards; *Suggestions for a National Congress of Photographers*, by Jabez Hughes; *Principles and Practice of the Great Portrait Painters*, by R. W. Aldridge; *A Suggestion*, by W. Brooks.

One meeting was devoted to a conversation upon the subject of the permanency of prints, introduced by the Secretary, and another to a practical demonstration, by Mr. Wratten, of the production of negatives by the Obernetter process.

Photographs, apparatus, and appliances have been exhibited by the following gentlemen, viz:—Messrs. B. J. Edwards, S. Fry, H. Garrett Cocking, J. Spiller, Kennett, F. Howard, Wilkinson, Tully, Bashford, Oakley and Co., W. Hunter, Spencer, Sawyer, Bird and Co., Harrison, Cussons, Miers, Attwood, and the Secretary.

A considerable amount of work has thus been got through during the session; and, in conclusion, your Committee trust that the same principles of social, pleasant, and happy intercourse which have hitherto guided your Society in its deliberations will always be maintained, and thus tend to promote, not only the pleasure and interest of each individual member, but also the further study and general progress of our art-science.

TREASURER IN ACCOUNT WITH THE SOUTH LONDON PHOTOGRAPHIC SOCIETY,
Dr. From Christmas, 1873, to Christmas, 1874. *Cr.*

Balance from 1873............	£10	6	11	1874. By Cash paid to Secretary, as per Vouchers attached...........	£10	3	0
1874. 18 Subscriptions received by *Treasurer*..	6	16	6	" Payment to Secretary as per Rule 7........	4	10	4
30 Subscriptions received by *Secretary*..	15	15	0	Balance........	18	5	1
	£32	18	5		£32	18	5

1874. Balance.. £18 5 1

The election of the Officers and Committee for the ensuing year was proceeded with, when the following gentlemen were chosen:—*President:* Rev. F. F. Statham, M.A.—*Vice-Presidents:* Messrs. Simpson, Blanchard, Hughes, Spiller, and York. [We may here state that Mr. Davis voluntarily resigned the position he had held for many years as Vice-President, on the plea that he could not attend each meeting, and, further, that he considered it desirable there should be changes in that office.]—*Committee:* Messrs. Bridge, Brooks, Hunter, Foxlee, Morgan, Aldridge, Wilkinson, Gandy, and Ayres.—*Treasurer:* Mr. Noel Fitch.—*Secretary:* Mr. Edwin Cocking.

Votes of thanks were awarded to the officers who had served during the past year.

Mr. Aldridge then read a paper *On the Principles and Practice of the Great Portrait Painters*. [See page 602.] Mr. Brooks also read a paper entitled *A Suggestion*. [See page 607.]

Owing to the lateness of the hour discussions on these papers were adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE ordinary monthly meeting of the Board of Management of this Association was held at 174, Fleet-street, on Wednesday, the 2nd instant,—Mr. W. S. Bird in the chair.

The minutes of the previous meeting were read and confirmed.

Messrs. Croft, Bergeman, and Laing were admitted members.

The SECRETARY announced that Mr. Woodbury had promised to lend a sciopticon and slides, and that other gentlemen had also promised slides, for the annual general meeting, which was fixed for Monday, January 11, provided a hall could be engaged for that night.

The Secretary laid before the Board a request from the Art-Union Sub-Committee for a grant of money to enable them to advertise the art-union distribution.

The CHAIRMAN was of opinion, which was supported by the members, that the Board had no power to grant money for such a purpose without a guarantee that the funds would not suffer in case of failure. A guarantee fund having been subscribed by the members the sum of £10 was voted for the use of the Art-Union Sub-Committee.

After some routine business the meeting was adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 10th instant,—Mr. Thomas Haywood, Vice-President, in the chair.

After the routine business, Mr. Benjamin Wyles, of Southport, read a short paper on *Accessory Exposure of the Sensitive Plate* [see page 606], and exhibited a number of very fine specimens of card portraits in illustration of his remarks. In reply to a question by the Secretary,

Mr. WYLES said he had found the effect to be greater when the plate had been exposed to light before, rather than after, exposure in the camera.

Mr. Frankland exhibited two fine specimens of highly-glazed portraiture by Mr. Sarony.

Mr. Pollitt showed an enlarged view of the Pyramids, 15 × 12, from one of Professor Piazzi Smyth's negatives, $2\frac{1}{4} \times 2\frac{3}{4}$. This was an excellent specimen of enlarging, being very perfect and sharp.

Mr. NOTON said he had been trying to make some nitro-glucose, and thought he had succeeded in producing 258 grains of that substance. The uncertainty of obtaining chemically-pure monohydrated nitric acid, and the conditions as to water not being present, had caused him to put off the attempt to a more favourable opportunity; but Mr. W. B. Bolton's two communications in THE BRITISH JOURNAL OF PHOTOGRAPHY in August last reminded him of a memorandum he had made about four years ago at the foot of page 128 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1869, and that he had not yet answered the query alluded to, viz.,—"Why not use saltpetre instead of nitric acid?" The experiment was tried yesterday, and the result was on the table. Some saltpetre was rubbed to a fine powder and dried in the oven. Some lump sugar was treated in the same way. The sulphuric acid was put out of doors to get cold. The saltpetre was put into a white preserve jar, being surrounded with cold water in a wash-hand basin—all out of doors. When the sulphuric acid was put to the saltpetre a very stiff mixture was made; more acid being added till sufficiently fluid, but still rather stiff. The dry sugar powder was dusted on, and gradually stirred in with the glass rod, no red fumes of nitrous acid being produced, and no colour. The sugar was immediately changed, and the mixture became viscous. After standing some time covered with a glass plate to keep in the nitric acid fumes (which were very moderate in comparison with those given off in making gun-cotton with saltpetre, the temperature being 100 degrees lower at least) a small portion was dropped into cold water; the sulphate of potash gradually dissolved away, leaving the nitro-glucose in the form of a white powder. The large mixture was then thinned considerably with cold water stirred in, and all put to filter. The nitro-glucose, being still in the form of a white powder (like starch in cold water), was well washed on the filter. The top of the paper was then got together, all lifted out of the funnel, and held in warm water; this united the particles into a pasty mass. It was now freed from the paper, pulled into shreds, and kneaded under warm water for some time. In making a second batch of nitro-glucose it was intended to put the sulphuric acid into the jar first, and then stir in the saltpetre and sugar, previously ground fine and thoroughly mixed together. If it turn out that the nitro-glucose made by the aid of saltpetre in lieu of the chemically-pure monohydrated nitric acid is good, and possesses the extraordinary properties mentioned by Dr. Monckhoven, a great impediment to its more extensive use will have been removed.

Mr. Noton also exhibited a pair of small blowing engines, of his own manufacture, in the tea-room. These engines excited a good deal of interest in the mechanically-inclined members.

The usual complimentary votes were passed, and the meeting was then adjourned.

Correspondence.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—Kindly permit me to announce that the first annual general meeting of the above Association will be held at the Co-operative Institute, 55, Oxford-street, on Monday, January 11, 1875. After the despatch of business there will be a sciopticon exhibition, an exhibition of the prizes in the art-union distribution, and a musical entertainment by photographic friends. There will also be a display of microscopes, graphoscopes, and other scientific apparatus. Refreshments will be provided at a reasonable price, and special arrangements have been made to secure the comfort of lady visitors. Further particulars will be announced in due course.—I am, yours, &c., W. T. WILKINSON,
174, *Fleet-street, December* 14, 1874. *Secretary.*

P.S.—I should be glad to hear from any gentlemen who may feel disposed to lend anything scientific for this occasion.—W. T. W.

"THE NEW LENS."

To the EDITORS.

GENTLEMEN,—The enclosed copy of analysis of the facts and statement of opinion in reference to the relative claims of Messrs. Grubb, Steinheil, and myself to the origination of the lens in question, by one of the most trustworthy patent authorities in this country, will probably answer the letters on this subject in your last better than any extended argument or reiteration of facts by myself.

In reference to the question of Messrs. Murray and Heath as to my intention of permitting the introduction of the Steinheil lens, which infringes my patent, into this country, I may simply state that as this is a purely commercial matter I can only permit such introduction on the arrangement of equitable terms.—I am, yours, &c.,
19, *Bloomsbury Street, London, W.C.,* J. H. DALLMEYER.
December 16, 1874.

"I have carefully considered the specification of a patent granted to John Henry Dallmeyer on the 27th September, 1866, No. 2,502, for 'improvements in compound lenses suitable for photographic uses.'

"I have also examined the specification of a patent granted to Frank Wirth, on the 31st March, 1874, No. 1,124, for 'improvements in photographical portrait apparatus and other optical instruments,' a communication from Adolphe Steinheil and Edward Steinheil, of Munich.

"I am clearly of opinion that the lens described in the specification of Wirth's patent is an infringement of the prior patent granted to Dallmeyer. It possesses both elements of the lens described and claimed in Dallmeyer's specification; not only does it consist of two pairs of cemented lenses with the outer lens of each pair of flint glass, but in addition the posterior combination is of smaller diameter than the anterior combination.

"I have also examined the specification of a patent granted to Thomas Grubb, in the year 1857, No. 2,574. In this specification is described the constructing a compound lens of two lenses cemented together—one of crown glass, and the other and outer one of flint glass.

"In the specification it is also stated that 'the lens admits of entering with advantage into combination with one or more other lenses of either similar construction to itself, or of other or ordinary construction.

"There is, however, nothing in the specification to suggest the peculiar combination claimed by Mr. Dallmeyer, and I am of opinion that Dallmeyer's invention is not anticipated by the prior patent granted to Grubb.

"WILLIAM CARPMAEL,
"24, Southampton Buildings, Chancery Lane.
"*December* 15, 1874."

To the EDITORS.

GENTLEMEN,—We are in receipt of a letter this morning from Messrs. C. A. Steinheil Söhne, begging that we will intimate to you and your numerous readers that in a short time they (Messrs. Steinheil) will furnish us with the necessary particulars to fully answer Mr. Dallmeyer's claim on their new aplanatic portrait lens. Will you please insert this in your next issue, and oblige.—We are, yours, &c.,

69, *Jermyn Street, London, S.W.*, MURRAY AND HEATH.
December 16, 1874.

EXCHANGE COLUMN.

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

I will exchange a Grubb A° view lens for a copying camera, to copy from one quarter to about 15 × 12. Difference to be arranged.—Address, RALPH HOLT, 114, Spring-street, Bury.

A pair of Newton's mahogany lanterns, three and a-half inch condensers, in box complete, will be given in exchange for a pair of four and a-half inch best condensers, as used in the sciopticon.—Address, H. COOPER, Donnan's Library, Northampton.

ANSWERS TO CORRESPONDENTS.

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

AN INVERTED BLOCK.—By one of those accidents which *will* sometimes occur, when the article on *Converging Perpendiculars*, at page 576, was being "made ready" at the machine, the block upon which the diagrams were engraved was placed *upside down*. To remedy this mishap, as far as possible, we have had a number of separate slips printed from that block, so as to afford an opportunity to those who bind the volumes to have it rectified by pasting the engraving correctly over the present inverted one. Any reader enclosing a stamped and addressed envelope in another wrapper to the publisher will receive the slip by return of post.

SIGNOR LOMBARDI.—Thanks.

S. S.—Fine felt will answer just as well as paper for filtering, and be far more durable. Try it.

GORGON.—A lens of forty-eight inches focus will give an image of the sun of about half-an-inch in diameter.

H. B B.—In our next. We are, in the meantime, short of information which we hope to obtain in time for our next number.

H. P. C.—Your letter is inadmissible. If you have retained a copy of it you will, upon reperusal at your leisure, discover the cause.

ASTRON.—The sample of india-rubber marked No. 1 is quite unsuited for dissolving. The small white sample dissolves very freely.

C. R.—The negative is too thin to be used in direct printing upon paper, but will answer quite well in the production of transparencies.

G. G. M. (Edinburgh).—We are afraid that the suggestions, although numerous, are scarcely suited for the pages of our ALMANAC. Thanks, however.

B. B. YATES.—For your purpose we would recommend the Schlippe's salt method of intensifying; but we do not advise that it should be used for portraiture.

OXON.—For ordinary negatives flatted crown will answer as well as, if not better than, patent plate. We presume that you have never before been in business.

MEDICUS.—The picture, *Stolen Moments*, is a photograph of an original composition by Mr. Hubbard, photographer, Oxford-street. It is a very skilful work of art.

DRY PLATE (Liverpool).—Mr. Gorden arrived at the conclusion he did after mature deliberation. We therefore think it unlikely that he would adopt your suggestion.

"GROPE IN THE DARK."—Either of the two lenses could be utilised as the front element of a portrait combination, but neither of them would answer as a back lens. If you combine them as they are, mount them about an inch and a-half apart, flat sides towards each other, and a small stop midway between.

R. F. S.—Ordinary negative or shellac varnish may be used for varnishing leather. One or two applications of lac varnish will restore your faded morocco case to its pristine condition.

C MAGRANE (Carrickmacross).—If you forward a specimen of your work we shall show it to a publisher. We believe, however, that at present the demand for that class of work is limited.

A. FINDLOW.—While willing, we have not at present time to write privately. State whether you possess a microscopic camera, and, if so, what kind, and we shall then be better able to offer advice.

ENCAUSTIC.—We have never heard of any instances in which fading was accelerated by the use of encaustic paste; but we do not think that by the use of such paste fading would be prevented.

J. B. G.—A square diaphragm placed between the lenses of your combination will not produce the effect desired; but, if placed behind the back lens, it will cause the field of illumination to be square also.

A LEITH READER.—Line the wooden body of the lantern with tin or thin iron, placed at a distance of over half-an-inch from the wood. Then fill up the space between the two with a non-conducting substance.

WEST SUSSEX.—Shake up the coloured solution of silver with either kaolin or freshly-precipitated chloride or carbonate of silver. The addition of a little permanganate of potash will likewise purify the solution.

S. H.—By agitating the subject in the local newspapers the necessary degree of attention will be directed to the evils of which you complain. The public outside of your town would not feel any interest in the topic.

G. P. REFOS.—Let the crystals be placed in a porcelain vessel, and then apply such a degree of heat as to fuse them. The oxide of copper will then, on dissolving the mass in water, be found at the bottom as a black powder.

AMATEUR (Birmingham).—The specification of Mr. Edwards's patent for the graphogenic apparatus may be obtained at the Patent Office, Southampton Buildings, Chancery-lane. A specification usually costs from fourpence to a shilling, according to its length and the number of its illustrations.

E. VILES.—It is probable that, by reducing the proportion of manganese, the Bateman stove will answer as well as any other. We have never experienced the necessity for employing so much heat as in your case. The wash-bottle you suggest is certainly an excellent one, and we have used it for many years.

PROVINCIAL.—We are not yet in a position to divulge the method by which the portrait on the tablet referred to was made. But certainly sufficient has been already published in these pages to enable you to produce burnt-in photographs with ease and certainty. When you next write say how many, if any, of the processes we have already described have been tried by you, and what amount of success you have obtained.

W. L. BREARE.—1. By addressing a letter to Messrs. Cassell, Petter, and Galpin you may ascertain from them the terms on which they would grant you permission to copy their engravings.—2. Try a grain of the platinum salt to each ounce of water. This will give such a tone as you desire, but one which, in our estimation, is too cold for the generality of subjects. We prefer the rich velvety brown so characteristic of Ferrier's slides.

⁂ Owing to unusual pressure on our space this week we are reluctantly compelled to leave over till our next issue No. VII. of Mr. G. W. Webster's series of articles *On the Use of Photographic and Chemical Apparatus*, and also Mr. D. L. Mundy's paper on *Photographic Experiences in New Zealand*, read at the recent meeting of the London Photographic Society.

RECEIVED.—"An Old Photographer" (Edinburgh). In our next.

NOTICE.—CHRISTMAS WEEK.

THE BRITISH JOURNAL OF PHOTOGRAPHY will be printed on WEDNESDAY NEXT, the 23rd instant, and published on THURSDAY NEXT, the 24th instant.

ADVERTISEMENTS intended for insertion in that issue should therefore reach the Office by TUESDAY EVENING next, the 22nd instant. SMALL Advertisements will be received up to Nine o'clock on WEDNESDAY MORNING next, the 23rd instant. Orders for Advertisements of the same class addressed to the "Printing Department," 32, Castle-street, Liverpool, will be received up to Two o'clock, p.m., on WEDNESDAY NEXT, the 23rd instant.

2, *York-street, Covent Garden, W.C.*,
December 18, 1874.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 764. Vol. XXI.—DECEMBER 25, 1874.

CONCERNING PATENTS.

The subject of patents is at present occupying the attention of the Society of Arts week after week, and it is not too much to hope that out of the discussion good will arise, for engaged in that discussion are some of the ablest authorities on patent law in the country. It is universally conceded that reform in the system of granting patents is desirable; but differences of opinion arise respecting the precise character of the reform most to be desired. In this country any person is at liberty to take out a patent for anything, even if a hundred patents had been previously granted for a similar thing; but each applicant must swear that he is the first, true, and sole inventor of the matter for which he seeks a patent so far as he is aware, and upon him devolves the trouble and expense of defending his patent rights against all comers.

The principle upon which a patent is granted is very simple, and may shortly be stated as follows:—The State virtually says to an inventor—We will give you a monopoly in your invention for a stated period of time on the payment of certain fees, and on condition that you give such a complete description of what you have invented as to enable the public to manufacture the article so patented after the expiration of the period for which we grant you the monopoly. But bear in mind (the State continues) that the monopoly we grant you is null and void if it be shown that you have patented anything previously known, or if you have not distinctly and definitely stated the full details of what you have patented.—Such, in the fewest possible words, is a summary of the law of patents in this country. In America the patent law is different. There each invention is submitted to a committee of investigation; this committee says "yea" or "nay" to an application according to its own will or knowledge. We are aware of instances in which much ignorance has been displayed by this committee from the inability of those considered experts in grasping the idea of the invention submitted; but, as numerous instances of a similar nature have been alluded to by those taking part in the discussion initiated and carried on by the Society of Arts, further reference here is not required; and, from the varied expression of opinion thus called forth, we do not believe that in any reformed patent law which may result that feature of the American system will be adopted. Indeed, it is rather problematical whether it will long remain in force in America, where there is at present an earnest demand for reform in the laws regulating the granting of patents.

A week has scarcely elapsed since a few gentlemen who dropped promiscuously into the "Editors' room" of this Journal, at 2, York-street, Covent-garden, soon found themselves busily engaged discussing the subject of our patent laws, and one gentleman was pleased to say that this Journal had acquired a reputation for the demolishing of photographic patents. Now, this is emphatically true, and yet quite as emphatically *not* true. We have certainly, on more than one occasion, have had to express convictions strongly condemnatory of certain patents granted in connection with photography, but never unless there were good grounds to justify our expressions of opinion. We have, however, invariably made a point of publishing our reasons *in extenso* for such action, and which, we are glad to say, have in no case been called in question. But, on the other hand, we have always maintained the soundness of the principle upon which patents were granted; nay, we have gone further, and have also asserted the soundness, within certain limits, of the system, not unknown in photography, of selling what are designated "secret processes." In an age and country like this, where generosity and philanthropy must go hand in hand with rates and taxes and securing the means of existence, it would be unreasonable in the public to expect any member of the community to undertake researches, resulting in the invention of something whereby the happiness and comfort of the masses will be enhanced, without making the inventor an adequate return for the boon so conferred. Here the patent system steps in with its offer to the inventor to secure to him a monopoly upon certain conditions; he accepts these conditions, and his invention is minutely described to the public, whose property, after the lapse of a specified period of years, it then becomes.

The sale of secret processes is in like manner, we maintain, quite correct in principle. The vendor says in effect—"I have at much labour and expense made a particular invention or improvement which will prove beneficial to the public, and I will impart my knowledge upon receiving a certain stipulated amount of remuneration." No one is compelled to purchase the secret; every person is at perfect liberty to try and find out the process for himself if he choose; but no one has a right to make a clamour after the purchase has been effected and the secret revealed, for no reasonably intelligent person would seek to acquire by a pecuniary outlay knowledge he previously possessed. It is not sufficient to say that the purchased secret has already been published. Such may have been the case; but the purchaser, when making the bargain with the vendor, was evidently unaware of that circumstance. Let us presume that anyone were to "discover" that the addition of nitrate of barytes to a negative bath secured immunity from pinholes and other evils, and to sell, as a secret, a method by which such pinholes and evils could be got rid of, but which, upon investigation, turned out to be the mode described in our pages long since by Mr. A. L. Henderson, the vendee would have no ground for complaint. It is evident that *he* had obtained for his pecuniary investment certain information of which he at least was previously ignorant, although it might be well known to those who had carefully read the pages of this Journal. But if the vendor dispose of something which, while alleged to produce certain results, will not do so, he is guilty of a fraud, and is liable to be proceeded against at common law.

We conclude with a word of advice to intending patentees in connection with photography. Remember, first, that if you patent anything previously known your patent must fail. Secondly, that if you do not give clear and full details of what is patented the same result inevitably follows. Thirdly, that in a patent embraced under several headings or points the presence of one bad claim invalidates everything contained in the patent; hence the importance of at once entering a "disclaimer" of the points discovered to be weak. Careful pruning frequently saves the tree, which otherwise might have perished. Fourthly, if it can be shown that you had previous knowledge of the thing patented from any other source, but which, nevertheless, you have claimed as your own, you may be indicted for perjury.

AN UNSUSPECTED CAUSE OF DETERIORATION IN GAS BAGS.

Everybody who has had much experience in the use of the oxy-hydrogen light knows that in a short time there accumulates in the oxygen bag a quantity of light, brownish, powdery material which, by finding its way into the tube and stopcock, frequently causes much trouble by obstructing the free passage of the gas. A case of this kind occurred last week at an exhibition at which we were present, causing a delay of nearly an hour; as, after each time the tube was removed and cleared by blowing, it was again choked by the powdery matter passing along with the gas, and it was not until we suggested the pouring into the bag of a few ounces of water, by which the powder was moistened, that the exhibition could be carried out at all.

Of course this interference with the smooth and regular working of the light is a serious matter, but not the most serious, as an examination of the powder itself, and of the source from which it is formed, abundantly shows. On subsequently examining the bag, which had been in occasional use for fifteen months, we obtained from it about seven ounces of the powder, a microscopic examination of which showed that it was altogether made up of filaments of cotton, varying in size from ·005 to ·5 of an inch, the larger pieces being cotton threads which had not lost their twist. Heated in a test tube the powder gave abundant evidence of its organic origin, and the application of the usual reagents proved that hydrochloric acid was present in large quantity.

Now if it be kept in mind that gas bags are generally made of two pieces of cloth with a stout sheet of rubber between them, there will be no difficulty and but little comfort in seeing where the powdery matter comes from, and it will be also quite plain that if the lining of an ordinary-sized bag be reduced at the rate of seven ounces in fifteen months it will not last long.

Gas bags are expensive pieces of apparatus, and therefore the questions—What is the cause of the disintegrading action? and How can it be prevented?—are of considerable importance to all interested in lantern work. Until very recently we have been taught to look upon the action of oxide of manganese, when mixed with chlorate of potash for the production of oxygen, as merely catalytic, facilitating the decomposition of the chlorate without itself undergoing any change; but we now have experimental evidence that this is not correct, and it is more than probable that at one stage of the operation it unites with a portion of the potassium of the chloride formed by the liberation of the oxygen, thereby forming potassium-manganate, and liberating a quantity of chlorine, which is always found mixed with oxygen made in this way.

Now, although chlorine gets credit for the possession of bleaching properties, and for exerting a destructive action on vegetable tissue or fabric, it really does neither the one or the other, as may be readily proved by submitting a piece of coloured cloth to the action of the perfectly dry gas for any length of time, at the end of which it will be found quite unchanged. If, however, a few drops of water be added to the vessel a change immediately takes place—the colouring matter, and ultimately the cloth itself, being destroyed. The explanation of the matter is simply that, although chlorine has no action on the cloth, it has such a strong affinity for hydrogen that it decomposes the water to get it, forming hydrochloric acid, and liberating the oxygen in a nascent state, in which it has a powerful action on all organic matter.

To the action of this nascent oxygen, then, we are indebted for the rapid deterioration of our gas bags, and, from what we have already stated, it will be evident that it can only be prevented by the absorption of the chlorine before it reaches the bag, or by taking care that no trace of water is carried along with the gas. A ready means of absorbing the chlorine would, undoubtedly, be the most effectual means of averting the evil of which we are now complaining; but we shall require to make some experiments before we are in a position to say what method will answer best.

When such experiments have been made we shall return to the subject again, and, meanwhile, we would recommend all who value their gas bags to pass the oxygen through a vessel filled with lumps of pumice-stone moistened with sulphuric acid, fused chloride of calcium, or any other of the well-known methods by which gases are dried, as, although this will not free the oxygen from chlorine, it will render that gas harmless, owing to the absence of water, through which agency alone the destructive action can be brought into play.

RESTORATION OF DISCOLOURED NEGATIVES.

In another page will be found a letter from a correspondent describing an evil to which all negatives much used are more or less liable, viz., the discolouration of the varnish to such an extent as not only to retard the printing, but also to detract seriously from the artistic value of the proof.

The hygrometric condition of the atmosphere in this country conduces to *dampness* both of the sensitive paper on which the image has to be impressed and of the varnish by which the negative is protected. The consequence is that a portion of the silver on the surface of the paper is transferred to the varnish, and then, under the influence of light, makes an impression which gradually impairs the original quality of the negative.

In addition to this there is the fact that the resins of which photographic varnishes are composed are themselves changed by light and air, some of them being bleached and others darkened according to the manner in which the oxidising or bleaching properties of atmospheric air and light act upon the particular resin in question, for it is well known that there are great differences in this respect. Among *savants*, however, even at the present day, much difference of opinion exists as to the exact part performed respectively by light and air in effecting these changes. Be this as it may, the remedy is simple. Let the discoloured negative be placed in a shallow dish containing a sufficient quantity of alcohol of the usual commercial strength of fifty-six overproof to cover it well; place a glass plate over the dish to prevent evaporation; gently tilt the vessel occasionally to promote solution of the varnish, and in a short time the whole of the varnish will be removed and the negative restored to its original state. After drying, the negative must be revarnished.

In our Almanac for 1873 a chapter was devoted to the subject of the removal of varnish by a solvent composed of caustic potash, water, and alcohol, with which the reader is, doubtless, familiar. This may be used with excellent effect instead of the alcohol above mentioned.

We must not omit to add a warning with respect to the use of strong *methylated* spirit. It is true that that compound is a most powerful solvent of the resins which are usually employed in the manufacture of varnish; but, at the same time, being a partial solvent of pyroxyline it is apt to destroy the image unless the negative be removed from it the moment it has effected the solution of the varnish. Under any circumstances it will weaken the collodion film, so that great care will be necessary in removing it from the vessel in which it has been subjected to the action of the alcohol. Hence the advantage of using non-methylated alcohol.

Should it be found that alcohol has no action upon the varnish, it may then be concluded that an amber varnish—of which chloroform is the solvent—has been used. In this case alcohol will prove entirely inoperative in removing it, and a solvent of the character originally used must be brought into requisition.

A CHEAP AND SIMPLE METHOD OF MAKING ENLARGEMENTS.

Photography, like most other arts which address the eye, has its fashions, and the demand just now is for enlarged portraits. The public are not content with *carte* and cabinet pictures for their albums—gems though they may be; they ask for large photographs, which they may hang upon their walls. All photographic portraitists, whatever rank they possess in their profession, are, therefore, interested in the subject of enlargements, in order that they may meet the wishes of their clients; and the question with many of them must be how to produce a presentable enlarged portrait at a moderate price, framed and glazed, and, if possible, owing nothing to the aid of the retoucher, for his work is costly.

Although this subject has already been discussed in our columns, yet photography is such a rapidly-advancing art that remarks which may have been true six years, or possibly even six months, ago may now admit of modification. We, therefore, in the interest of many of our professional readers return to it, with such new facts and new light as increased knowledge and experience have brought to bear upon the matter.

That method of producing enlargements which was at one time much practised, and which was patented about seven years ago by Mr. Sarony, under the designation of "photo-mezzotints," is doubtless too well known to our readers to need recapitulation; and a method of "finishing" such enlarged transparencies, patented by Mr. Palmer, and known under the name of "creta-photographs," and described in our Journal two or three years ago, will also, doubtless, be known to them. In the former the enlarged transparency is backed with paper containing hatchings or other pencilled markings; and in the latter the picture is varnished with an opaline or matt varnish, so as to prevent the paper with which it is backed from being very clearly seen. We now give an extension of these ideas, communicated to us by Mr. Kinsley, who has produced excellent results by it and freely communicated the following particulars, which we now publish for the benefit of our readers.

The process consists in putting the original small negative into a copying camera, with the sky for a background, and making from it an enlarged transparent positive upon a collodionised glass plate. This done, the positive is coated on the film side with a white varnish, which dries quickly; and then, behind this, is placed as a backing coloured pieces of paper of different tints, which show faintly through the varnish. The glass plate, with the portrait at the back, is then put into a frame. Such is the process, and we have now only to state more minutely how it is carried into effect.

The enlarged positive is made with an ordinary collodion and nitrate bath; but, instead of being developed with iron, it is developed with pyrogallic acid, acidified with a mixture of acetic and citric acids. The object now is to preserve to this developed print sufficient vigour in the blacks to make it a presentable picture when backed with white varnish and viewed from the opposite side of the glass. This, with some, has proved a difficulty in this mode of enlarging, the developed print, when fixed and toned, having a tendency to look feeble and mealy, somewhat after the fashion of the picture called *At Bay*, which forms the frontispiece of this year's Christmas number of the *Graphic*.

But Mr. Kinsley's positives which were shown to us do not err at all in this unfortunate direction, but are as vigorous in the blacks as if printed in carbon. The way in which he proceeds after he has developed the picture is, therefore, a useful "dodge" to know. It is as follows:—Instead of washing off the developer, and then fixing and toning the picture with gold, he puts the plate, with the developer still upon it, into a bath of hyposulphite of soda, to which he has previously added a little acetic acid, and which is, consequently, milky from the presence of free sulphur. In this bath—which, of course, tones the print by sulphuration—the plate is kept moving about for a few minutes; it is then removed, washed, and fixed in a fresh bath of hyposulphite. No gold toning is necessary, for the blacks of the print are rich and vigorous without it. The question as to how far such prints are likely to be permanent we will not now discuss; but it must be remembered that they are developed upon *iodide* and not upon *chloride* of silver, which is certainly in their favour.

The next operation consists in coating the print, when dry, with a thin white varnish. This is made by mixing together in a mortar—

Picture varnish	1 part.
Turpentine	3 parts.
Chinese white	*quant. suff.*

It is poured over the plate in the same way as collodion, and dries in three or four hours. The picture varnish costs about fourteen shillings per gallon. The Chinese white must, of course, be very finely ground.

When the varnish is dry, pieces of coloured paper are fastened to it, so as to give a pale tint of the required colour to the flesh, dress, background, &c., of the portrait, when viewed from the front. The picture is now finished, and may be put into its frame, no retouching whatever having been applied to it. Pictures thus made and framed can be sold, with a fair profit, at £1 5s. The size of those which were shown to us was about that of a whole sheet of photographic paper. They have not the same vigour as a fine silver print upon albumenised paper; but, from the nature of the process, and being upon the smooth surface of a glass plate, they are very soft and pleasing in effect when well and artistically executed. The original negative may be either of *carte* or cabinet size. The model should be properly lighted, and the negative free from technical defects. It should not be too dense, but rather thin, and perfect in its gradations.

Some of our readers may remember that Mr. Campbell, of New York, brought out some years ago a patented process to which he gave the name of "ectograph," and which was similar in principle to that described above; but he used wax instead of white varnish, and his prints were devoid of vigour.

In bringing our twenty-first volume to a close, we do so with a conscious satisfaction of having fulfilled all the promises made at the commencement of the present year. The public judges from deeds rather than from words, and as evidence of this we have gratefully to acknowledge a considerable increase in the number of our subscribers. What we have done in times past we shall endeavour to improve upon, if possible, during the year upon which we are about to enter—which will be the twenty-second year of our existence—namely, supplying the earliest and most reliable information upon all photographic matters transpiring at home and throughout the world, and in connection with which we may say that our invaluable American correspondent, Mr. M. Carey Lea, has again returned to Philadelphia. A new feature will be introduced during the year 1875. We have long entertained the opinion that our readers would appreciate the portraits of those whose names are inseparably connected with the rise and progress of photography—names which, during a long period of years, have been prominently before the readers of this Journal. We have, therefore, arranged to give in our pages, once a month, a series of portraits of those whose names are "familiar as household words" in connection with photographic science and literature. Each "counterfeit presentment" will be accompanied by such biographical information as will prove both acceptable and interesting. This, with other features of interest to be developed in our forthcoming volume, will, we believe, be generally appreciated. With these remarks we greet our readers with the usual compliments of the season, wishing to each and all, in good old English fashion—"A Merry Christmas!" and "A Happy New Year!"

HYPOSULPHITE OF SODA NOT THE CAUSE OF FADING OF SILVER PRINTS ON ALBUMENISED PAPER.

In making the above assertion, and attacking the orthodox belief that silver prints fade owing to the presence of imperfectly-removed hyposulphite of soda, I may, probably, meet with much adverse criticism; I will, therefore, proceed to give my reasons for this new view of the matter—reasons which I believe, from numerous experiments, to be founded on absolute facts.

In the first place, "fading" is a term applied both rightly and otherwise to silver prints that have lost their pristine vigour. When it applies to mere loss of colour it is quite correct; but oftentimes the print thus designated has not lost colour, but has, owing to a degradation of the whites and lighter portions, become flatter or wanting in contrast. That a print thus changed will ultimately fade is most probable, although I have not verified it by direct experiment. Almost all faded prints which have come under my notice have been more or less yellow in the lights than they were originally.

Fading, also, may consist of a group of spots with or without nuclei, or small patches of discolouration. Spots containing a nucleus, although similar in appearance to those without, are generated by an entirely different cause, and seldom become confluent—that is, spreading over the whole surface of the paper in course of time—but remain decided spots whilst the picture lasts. These, then, are the most usual forms in which fading comes under our observation.

Why fading takes place has been a matter of, perhaps, as much inquiry as any photographic operation whatever. The great importance of securing absolute permanency has been acknowledged from the first, and our inability to do this has, perhaps, been a blessing in disguise, inciting the inventor to adopt other methods of printing that, had permanency attended our earlier efforts, would probably have been delayed. No mechanical printing can, however, permit the alterations and modifications of the picture with anything like the facility of silver printing; and for this very reason silver prints will always have a beauty and value that mechanical printing can never hope to attain. Why do they fade? Scores of reasons are given; and yet in the most unaccountable way, when all precautions have been taken to secure permanency, the enemy still appears. At the same time, there can be no doubt that careful manipulators will have greater chance of success than slovenly ones.

Again: prints supposed to contain *certain* elements of decay last pure and bright as the day they were made—sulphur-toned prints, condemned of all, occasionally remaining unchanged. There is no doubt that the presence of various bodies in the proof will aid and abet, if not originate, fading; their removal is, therefore, a necessity. Fading seems to be this:—During the changes which take place in the substance of the fading print, the silver and its compounds (of which the image consists) is gradually transformed into a colourless substance insensitive to light, leaving its metallic or oxidised condition to become a salt by combination with certain acids generated during the decomposition of the albumen.

That a poor, faded print contains the *same amount of metal* as a bright, fresh proof is easily demonstrated, which conclusively proves that the change consists not in the dissipation, but in the alteration, of the form in which the metal exists. This partially explains the loss of colour in the image. We must also bear in mind the exceedingly small quantity of silver that forms the image of a finished proof; the extreme division or attenuation the metal has undergone permits chemical changes to take place that would be almost impossible were it of a greater bulk.

From these premisses we may safely infer that if albumen could be rendered indecomposable, and no more metal than that reduced by the light and forming the image be left in the proof, the method of producing permanent silver prints would be secured.

I will now enumerate the principal causes to which fading has been ascribed, remarking on the same *seriatim.*

First and foremost, the presence of hyposulphite of soda from imperfect washing is universally considered the principal cause, and many ingenious ways have been used and suggested for its removal, but, so far as I can learn, with only partial success, if the end to be attained were the permanency of the proof. Secondly, insufficient fixing, the hyposulphite solution being too weak or not applied for a sufficient length of time, the temperature too low, or the hyposulphite inferior in solvent qualities. Thirdly, improper mountants. Fourthly, the presence of hyposulphite in the mounts. Fifthly, fixing in the unprotected daylight. Sixthly, objectionable matter in either paper or albumen. These, I believe, are the usually-accepted reasons for fading, separately or conjointly; and there is no manner of doubt that they accelerate, if they do not inaugurate, the destruction of the print.

I will now take these attributed causes in due sequence, and endeavour to show the amount of reliance to be placed on each. The presence of hyposulphite from insufficient washing is the first sweeping condemnation a faded print gets. The hyposulphite, being an unstable sort of compound, is supposed, with more or less reason, to part with its sulphur to combine with the metallic salts left in the paper, and so produce fading. Yet, in the face of this, prints that have only been slightly washed (certainly not having the hyposulphite thoroughly removed), and prints that have been sulphur-toned in the old hyposulphite and gold bath, have been found to remain as perfect to the present time as those toned and washed in the most approved modern fashion. If their destruction depended on the presence of hyposulphite or the liberation of sulphur, why have these remained intact? Why, out of a batch of prints most carefully manipulated, do some fade and some remain good? These are questions that, I believe, cannot be satisfactorily answered on the present hyposulphite theory.

Secondly: insufficient fixing. This, as a matter of course, causes the certain and rapid destruction of the prints, and is so self-evident that it need scarcely be mentioned; but as it is sometimes called "fading" I desire to touch on all the usual reasons.

Thirdly: improper mountants. These require rather more examination, for, in my opinion, prints fade more from this as an exciting cause than from the presence of hyposulphite. The substances usually employed for this purpose are flour, starch, glue, and gum, or mixtures of these materials. Flour, starch, and its congeners are, undoubtedly, the *most dangerous* substances that can be used, unless mixed with some powerful antiseptic, as carbolic acid; at the same time they are the most cleanly and workable and, I think I am right in saying, most universally adopted. Glue, gelatine, isinglass, and gum arabic are the safest (unless the starchy matters are carbolised or rendered unfermentable by other means), but more unpleasant to use; in fact, prints that have been carefully manipulated and mounted with gum arabic are most slow to fade of any, unless subjected to the action of a damp atmosphere. Any substance that will ferment, putrefactively or otherwise, is unsuitable for mounting purposes, unless prepared with some antiseptic. Albumen is easily decomposable, and, being an organic matter, is subject to putrefaction, readily induced by contact with other bodies in an incipient state of decomposition. As a proof of this, if a piece of albumenised paper with the albumen either soluble or rendered insoluble, but without silvering, be subjected to the influence of moist, warm air, it will soon become of the pale, dirty yellow colour peculiar to faded prints. If, then, the albumen itself be subject to this change, how much more so is it likely to be when in contact with already partially-decomposed substances as the mountants alluded to?

My opinion, based on many experiments and examinations, is that fading is mainly *owing to the putrefactive decomposition of the albumen*, irrespective of any other cause, accelerated as it may be, or modified in its appearance, by the additions it receives in the course of printing and mounting. Undoubtedly, many substances will produce fading, but their effect depends on the simultaneous decomposition of the albumenous vehicle that contains them.

Fourthly: the presence of hyposulphite in the mounts upon which the prints are attached is, I believe, of very little importance. It may possibly influence the print under certain conditions, but the danger likely to accrue from this source is very remote.

Fifthly: fixing in unprotected daylight is, again, a matter for serious consideration. During the process of dissolving the chlorides, hitherto unchanged by the light, in the presence of actinic light, we induce a condition of insolubility, and retain in the paper the very metallic compounds we desire to get rid of. The effect is not at once visible; but after a time the light and air will surely cause their decomposition, and a yellowing of the whites on the proof will take place, if not a general fading of the image. Another similar effect, but from a different cause, takes place when a careless printer examines his proofs in a white light during the printing; for, although the subsequent toning and fixing may *superficially* remove the discolouration, sooner or later the prints will change to the same dirty yellow as that induced by other causes.

Sixthly: objectionable matters in the substance of the paper or albumen. Few samples of paper, if any, are absolutely free from contaminations of this sort. Some of them give rise to a spotty kind of discolouration, the spots invariably containing a nucleus—iron spots, for example—but remain within certain limits, not spreading over the whole surface of the paper, however long it may be kept. A very frequent cause of spottiness of this character, and wrongly attributed to the manufacturer, is dust settling on the damp surface of the paper during the silvering process. Dust, it is to be borne in mind, in a photographic establishment is of a specially complex nature, and may cause a great variety of imperfections difficult to trace to their source, the onus of the fault being usually charged to the paper manufacturers, who, I am afraid, have to bear the sins of many careless manipulators.

That hyposulphite of soda left in the print is not *per se* the cause of fading may be proved by redipping a *properly and carefully-fixed and washed print* in a little fresh solution of hyposulphite for a few minutes, then slightly washing, say for five minutes, in running water—so long, at any rate, that there may be decided traces of hyposulphite left on it. This print will be found quite as permanent as those not subjected to this test, and from which every removable particle of hyposulphite has been washed, providing the other conditions of stability before mentioned have been adhered to.

The necessary conditions of permanency seem to be entirely within the control of the printer and mounter, and not such a haphazard affair as it is usually considered, and who must see that by neglecting *one point* in *any part* of the process fading is certainly induced. To ensure permanency silver prints should never be subjected longer than is absolutely necessary to the influence of moisture in either toning, fixing, or washing. The system of long washing is particularly objectionable; the prints are invariably not only rendered less permanent but deteriorate in colour. Acting upon these data I have succeeded in producing permanent silver prints, so far as could be ascertained without the absolute lapse of time, and as unacted upon by sulphuretted hydrogen as unprepared albumenised paper, and equalling in a demonstrable permanency the gelatine and pigmented mechanical prints of the present time.

EDWARD DUNMORE.

NOTES FROM THE NORTH.

ENLARGED photographs painted in oil or water colour are gradually becoming a more and more important branch of the photographic profession; but, judging from the frequent reports of cases in the county and sheriffs' courts, there would seem to be a curious looseness, both on the part of the employers and the employed—or rather, I should perhaps say, the commissioners and commissioned—in the preliminary arrangements.

Such a case, possessing several points of interest, was recently before the sheriff's court here. A Leith photographer, who keeps himself before the public by advertising "high class work at low prices," was some time since commissioned by a husband to make a painted enlargement from a *carte de visite* of a deceased wife, and the sum of six guineas was agreed on as the price to be paid. Subsequently, however, the commissioner's ideas seem to have expanded and his liberality to have increased, as the photographer was ordered to make the picture larger and better without further stipulation as to price, except that it was mutually understood that, if a good job were made, a good deal more would be paid.

So far all went well, and the artist set about his work in the full hope that such a good beginning would have a happy ending. The Fates, however, had otherwise decreed. The work was by-and-by completed, and, from the photographer's own showing, to the satisfaction of all concerned, except, perhaps, the one principally interested—the employer and paymaster. He, however, seems to have had a mind of his own, and a mind, too, in his own estimation at least, sufficiently trained in artistic appreciation to entitle him to sit in judgment on the painter's work, and even to give him a hand in trying, by the suggestion of several alterations, to make the picture what such a work of art ought to be. All, however, would not do; and when it was proposed to send the finished article home, in exchange for the modest sum of thirteen guineas, the commissioner at first politely, and afterwards in a manner very much the reverse, refused either to receive the one or pay the other, on the absurd ground that the painting "bore no resemblance" to the lady whom it was supposed to represent.

This determination was not by any means satisfactory to the unfortunate photographer. Canvas and paint cost money, and even the painter required to be paid; so he resolved to set in motion the machinery of the law, in the hope that a little compulsion would produce the desired effect in extracting the guineas from the pocket of his unappreciating customer. The majesty of the law, however, represented by the Sheriff, had some difficulty in settling the matter off-hand, and hardly seemed to be duly impressed by the honest and business-like reply of the pursuer to the objection of the defender, *i.e.*, that "an enlargement of the *carte de visite* only and not a portrait of the lady was guaranteed." He, however, expressed a wish to get more thoroughly to the bottom of the business, and remitted the matter to our friend Mr. Ross (of Messrs. Ross and Pringle) to examine, and say whether the work had been executed in a proper, artistic manner as an enlargement painted in oil of the *carte de visite* in question, and also whether the price charged was fair and reasonable. This was rather a tough job for Mr. Ross, but he was equal to the occasion, and reported that, in his opinion, the picture was not executed in a proper, artistic manner; that it was, in point of fact, not painted on an enlarged photograph at all, but had been outlined from an image thrown on the canvas by the magic lantern. The painting, he considered, was defective as a likeness, and the price excessive; but, as it was capable of improvement, he thought that justice would be done to all concerned if the sum of six guineas were allowed. I do not know what the commissioner thought of this report; but I do know that in the estimation of the photographer it caused the ability of Mr. Ross for this kind of work to sink to zero, so that if a similar hitch should again occur our friend need not expect the position of referee. So absurd, indeed, did the report appear to the photographer that he told me himself that, rather than give the Sheriff the chance of acting upon it, he would pay the expenses already incurred and keep the picture himself. This resolution I suppose he has carried out, as the matter has not again been reported amongst the ordinary proceedings of the court.

Of course I have not told this story for the sake of its local interest, but for the moral in the shape of a word of advice which I would give to all who undertake such work. Have a book in which to enter such orders; set down all particulars, especially including the price agreed on, and then get the signature of the employer to confirm the bargain. I am not aware whether Mr. Hooper's set of books include one that can be used for this purpose; but, if not, I herewith present to him the hint for nothing, and shall be glad to see him act on it in his next edition.

Iodides have been for a long time at famine prices, and, although they have latterly been "looking down," photographers will be glad to hear that they are likely to be much cheaper still—in fact, to be, in more senses than one, "drugs in the market." There has recently been found in Chili a very large deposit of a compound of iodine. What the iodide is I have not heard, but have no doubt we shall soon know all about it. The origin of iodine, as is generally known, has hitherto been marine plants, and, as the produce was limited in quantity, it was now and then bought up wholly by one man, who, having thus obtained a monopoly of the article, was able to command his own price; but if the Chilian discovery turns out to be true that is not likely to occur again. Photographers who use bichloride of mercury have to thank the same gentleman for the absurdly high price of that article at present, his long purse having enabled him to take possession of the available sources of mercury, and so raise its price to about eight shillings per pound—at least three times what in fair, honest dealing it ought to be.

We are going ahead here, some of us having either so much money that we can afford to work for next to nothing, or so little that we must make a bold bid for patronage. A photographer in one of the principal streets of Edinburgh is advertising copies from old negatives at three shillings per dozen. I hope, however, that his *confrères* are too much alive to follow suit, as, if I have any knowledge of what constitutes a good picture, they have very little to fear from such improper competition. Of the few of his pictures I have seen I can honestly say that the money was well worth them.

Mr. Turnbull deserves much praise for his persevering determination to improve the lamp for use in the lantern. As will be seen from the report of the last meeting of the Edinburgh Photographic Society, he had it on exhibition again; but, from unforeseen mechanical disarrangements in the lantern in which it was tried, the full value of his improvements was not visible. One evening last week a number of gentlemen interested in the subject were invited to meet in the rooms of Messrs. Ross and Pringle, to see the sciopticon lamp and that of Mr. Turnbull working side by side. The power of the sciopticon was first shown by an exhibition of some fine photographs of Egypt—the same that Mr. Ross kindly lent for the last "popular evening;" and, with the exception of the frequently-complained-of perpendicular shadow that often appears on the centre of the screen, the lamp did its work satisfactorily; in fact, it was admitted by some of those present that, for a certain class of pictures, to be exhibited in a small room, the sciopticon, as at present arranged, was more suitable than the lime-light lantern. Mr. Turnbull's lamp was next placed in an ordinary lantern, lighted, and a picture projected on the screen, when it was found that the illumination was better. Mr. Ross, who admits a slight weakness in favour of the sciopticon, which has done him much good service, directed attention to the only apparent defect in the disc—the images of the three wicks in the form of three bright lines in its centre. This defect, however, was cured by the removal of the reflector, without lessening the brilliance of the disc of light. The lamp is circular in form, and contains sufficient oil for two or three hours' burning. It has three wicks arranged side by side, the outer two converging as in the sciopticon, and the necessary current of air is produced by a glass chimney. In the lantern the lamp is placed so that the edges of the wicks are nearly, but not quite, turned to the condenser, its circular form admitting of this being easily done.

JOHN NICOL, Ph.D.

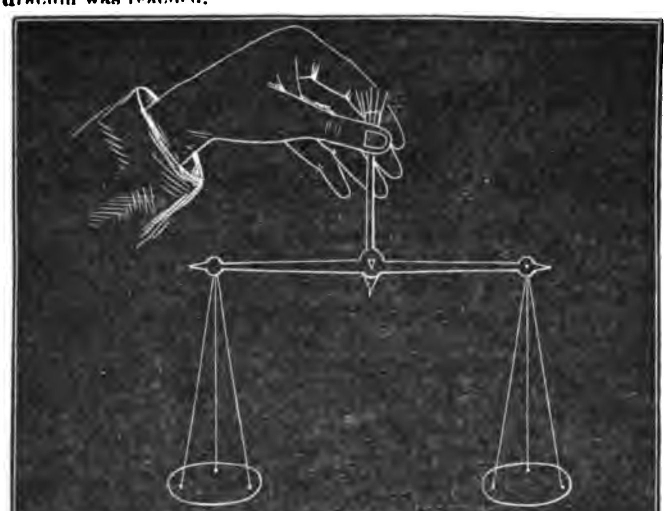
ON THE USE OF PHOTOGRAPHIC AND CHEMICAL APPARATUS.

CHAP. VII.—*(Continued.)*

On comparing our English weights and measures with this beautiful and easy metrical system its clumsiness and incompatibility will at once be seen. There is no essential or easily-expressed connection between the measures of capacity, weight, or linear measure. There are two kinds of ounces and there are two kinds of pounds; while the most useful system of the series—the old apothecaries' weight—is abolished. The troy ounce is now the most convenient. It contains 480 grains—a number which can be freely subdivided without a fraction, the avoirdupois ounce of 437·5 grains being a most unmanageable quantity. The various denominations are as follow:—

1 ounce, troy = 480 grains.
" avoirdupois = 437.5 grains.
1 fluid ounce = 8 fluid drachms = 437.5 grains of water, or 480 minims.
1 pound troy = 12 ounces, or 5,760 grains.
" avoirdupois 16 ounces, or 7,000 grains.
1 pint = 20 fluid ounces, or 8,750 grains of water or 34·659 cubic inches.
1 gallon = 8 pints, or 160 ounces, or 70,000 grains.

The confusion between a minim, the $\frac{1}{480}$ of an avoirdupois ounce, and the grain, the $\frac{1}{437.5}$ of the same ounce, but the $\frac{1}{480}$ of the troy and the old apothecaries' ounce, is most frequent. Fortunately, however, its use is rapidly dying out for strict chemical operations, though for commercial purposes and for less exact uses it still holds sway. It is also a measure current among the retail chemists, upon whom dependence has mainly to be placed for the supply of materials and chemicals. The minim, again, is generally confounded with a drop—the most unscientific and unequal representative of a measure it is possible to conceive. For statement in any formula or proportion its utter uselessness will be seen when it is learned that a drop varies, according to the liquid to be measured, to a most remarkable extent—weak hydrocyanic acid, according to Durand, giving forty-five drops, and sulphuric ether 150 drops, in one drachm; while other liquids give all ranges between. Taking Professor Proctor as a guide, forty-six drops of water amounted to a drachm, and 143 of alcohol, while the extraordinary number of 276·5 drops of chloroform were required to be dropped before a drachm was reached.



METHOD OF HOLDING THE SCALES IN WEIGHING.

Passing on now to the implements of measuring, the ordinary graduated glass measure at once attracts attention as the most familiar and useful article in the laboratory or in the photographer's dark room. It can be had so small as to hold a few minims only, and, on the other hand, large enough to measure half-a-gallon. In shape it is either cylindrical or conical; the latter is to be preferred for small volumes, and when the same utensil is likely to be used for all quantities of liquid from a tenth or twentieth of its capacity up to the fullest extent of its measuring powers. Care should be exercised in selecting them well formed. The inside of those of ounce and two-ounce capacity should be sufficiently wide at the bottom to allow of the finger or thumb readily reaching it for the purpose of cleaning and preventing the lodgment of a permanent deposit. If a measure require always a stick or a piece of rag to clean it, it may be safely predicted that it will frequently be put away dirty, and lay the foundation of future mischief. The lip also should be broad, and not so confined as to favour the accumulation of dirt. The cylindrical ones are the best for large quantities, as the whole hand can readily be put in to clean or wipe them. All new measures should be carefully tested by weighing before being taken into use, as the graduations on some of them are false to a most misleading extent, two small measures frequently varying to the extent of ten per cent. or more. To test them a perfectly level place on the table or work bench should be selected, and if not quite true made so with the aid of a spirit-level. This spot once made true can then always be used for the purpose.

Having first carefully counterpoised the measure, water should then be introduced to weigh exactly the quantity indicated by the first graduation marked on the outside, taking care that none of it splashes on to or wets the sides, or forms bubbles; a pipette or a syringe will be convenient for the purpose. Notice should be taken whether the weighed quantities scrupulously coincide with the graduations cut in the glass, and if there be the slightest deviation the measure should be rejected at once. Each marking may be tested in the same manner, though when the lowest, the highest, and the middle graduations are correct it may generally be assumed that the rest are the same. In measuring fluids, such as water, alcohol, &c., &c., which wet the measure, it will be observed that their level is raised where they touch the glass. The level of the whole surface and not of the raised rim is to be taken as the guide. It would save a painstaking student both expense and uncertainty if he were to graduate his own measures—at least those of the less delicate description—and it could easily be done. The plain measure is first coated thinly with wax, and as the successive quantities of water, accurately weighed, are gradually introduced, a small horizontal scratch with a sharp point (a needle fastened into a short stick will answer admirably) is evenly and carefully made on a level with the undermost of the two lines which the surface of the water forms. When a sufficient number of graduations are recorded the measure with these scratches is to be covered over with a paste composed of finely-powdered fluor spar and sulphuric acid. After the lapse of a day or two the mixture and the wax can be removed, when the graduation will be found complete, etched in by the aid of the acid

In using a measure, pouring into it from a bottle, it may be remembered that there is, as I have before remarked with regard to other operations, a right and a wrong way in everything. Holding the measure between the finger and thumb of the left hand, and then removing the stopper by the lower part of the same hand, as shown in the sketch, it should be raised to the level of the eye, held perfectly straight, and the fluid carefully poured in, without splashing or producing bubbles, till it reaches the required height, as indicated by the graduations. The stopper should never, if it can be avoided, be laid down at all; it is too apt to get contaminated with dirt of some description. After pouring, and before replacing the stopper, it should be drawn across the bottle lip where the fluid passed over, so as to catch the drop that generally accumulates there and runs down the side of the vessel when it is held straight. The bottle should always be poured from on the side away from the label, so that any dropping that may occur from the lip will not run across and injure the label if the liquid should be of a corrosive nature. These are all apparently trivial points; but the sum of dexterous manipulation in both photography and chemistry is composed of attention to a multitude of little things.

It will readily be seen that the large space covered by the surface of the liquid in these graduated measures does not permit of very delicate measuring, small increments of liquid producing no perceptible effect. Where greater accuracy is required, especially with small quantities of liquid, other methods are employed which will now be alluded to.

In many analyses certain standard volumes are in frequent request in which great exactitude is needed. In measuring these most conveniently a flask is made use of which just holds the required quantity when filled part way up the neck, the exact point being marked by a line or a ring etched or filed. They are used both with and without stoppers, and it may be noted that the measuring line refers to water at a standard temperature—a matter of some importance, as the same amount of fluid would occupy very different volumes at different temperatures. To the student anxious to make as much as possible of his own apparatus a few selected bottles (ordinary medicine phials, old collodion bottles, &c.) will be very excellent substitutes when carefully filled, weighed, and marked. It frequently happens that certain liquids have to be mixed together to produce solutions in constant request—such, for instance, as iodised collodion. When great accuracy is not needed, it is sufficient to make a file mark on the bottle for each constituent, and perform the mixing in the bottle itself which is ultimately to contain the liquid. Where greater nicety is required a graduated stoppered bottle or a graduated test mixer is made use of. These instruments explain themselves—the "test mixer" is best stoppered, as then the contents can be shaken instead of being stirred with a glass rod.

The most important of all measuring apparatus—instruments which have given a vast power to the chemist, and almost revolutionised the practice of some departments—are the burettes or alkalimeters and the pipettes. The latter have been treated of under the head of decantation; the former may be described as tubes accurately and finely-divided for holding fluids and delivering them in small measured quantities. They are filled at the beginning of an operation; and, when the required volume of fluid has been withdrawn—sometimes by numerous successive instalments—a glance at the figure on a level with the fluid shows the quantity used. The marking on the scales of these instruments is just the opposite to that on the ordinary graduated measures—the top line is zero, and the numbers increase downwards instead of upwards; the reason is obvious. In reading these it will be observed that the surface of the liquid is concave, and the two levels before mentioned from which graduation might be noted will be seen. It is customary to take the bottom line, that of the general level of the liquid; but it is really immaterial which is chosen, so long as in the same operation one mode is always adopted. There are several forms of these instruments, the chief one being Mohr's, with its various modifications. There are also Binks's, Guy Lussac's, and the old alkalimeter—a graduated cylinder with a grooved stopper to allow of the exit of the fluid. It requires the delivering part to be greased with a small lump of tallow (hardened by the addition of a little wax), through which a hole is thrust with a needle, the liquid by this means being delivered freely, and without running down the sides.

Binks's burette consists of a tube, closed at one end, and drawn out at its mouth into two necks, one of which is still further extended so as to form a dropping-spout. This is a generally useful form. In Guy Lussac's a sort of spout or long tube runs from the bottom of the graduated tube, and is continued in a vertical direction to the height of the instrument, its end being curved and drawn out fine also for delicate delivery. This is a most delicate instrument in its indications; but is very fragile and liable to fracture. This fault, however, can be provided against to some extent by putting a piece of cork between the two tubes and tying them round with a piece of thread, tow, &c.

Mohr's burette—the most generally used of all—is a graduated tube, open at both ends, the lower end being drawn out to a point to which is attached a piece of caoutchouc tubing through which the fluid escapes, the flow being regulated by means of a clasp or "pinchcock," which is opened whenever any of the contents are to be delivered. With some liquids the use of india-rubber is inadmissible, as it is liable to be acted upon by them—solutions of iodine, permanganate of potash, &c., for example. This ill effect is obviated by the use of a glass stopcock to the burette instead of the india-rubber connection. This, however, adds to its cost and is rather more difficult to deal drops from than the other form, which is also sometimes provided with two pinchcocks to regulate the flow, a thin continuous stream or a steady dropping, as may be desired, being produced. There are supports of various sorts sold for holding these instruments when in use.

Schuster's alkalimeter is very useful for dropping small quantities. It is a very light stoppered bottle with a second neck drawn to a point, the quantity delivered from which is ascertained by weighing both before and after use, the difference giving the amount withdrawn. Great care and great nicety are required with all these instruments. Here, again, absolute cleanliness is required. When the same apparatus is used for various reagents grave errors may be most easily introduced if the utmost care be not taken in removing every trace of its former contents each time the burette is used, a copious supply of distilled water being eminently desirable.

G. Watmough Webster, F.C.S.

FOREIGN NOTES AND NEWS.

Dr. Janssen's Daguerreotypes of the Transit of Venus.—His Revolver.—The Daguerreotype *versus* the Collodion Process.—The Reflectoscope.—Hannecker's New Light.—Dr. Vogel's Recent Researches.—Testing for Hyposulphite of Soda.

In alluding, a few weeks ago, to some experiments made by M. Cornu in astronomical photography, in which he had used daguerreotype plates instead of collodionised glasses, we took occasion to suggest the superiority of the former for all scientific purposes where great accuracy is required. We stated, also, that the French expedition, under Dr. Janssen, for observing the transit of Venus had gone out provided with daguerreotype plates. At a recent meeting of our own Astronomical Society the Astronomer-Royal, Sir George B. Airy, expressed himself very strongly in favour of the daguerreotype process for astronomical purposes; and in reference to what he said on this subject there appeared the following paragraph in *The Times* of December 12:—

"The Astronomer-Royal made one curious admission. Referring to Dr. Janssen's telegram, he stated his opinion that there was 'no comparison between glass photographs and daguerreotypes' (which all the French parties use). 'The latter were infinitely more accurate.'"

"Infinitely more accurate!" What an expression from such a man, who is so noted for calmly weighing his words and who is so high an authority on this subject! But will they have any weight with scientific men in England? or are French *savants* alone to have the credit of employing the best process? It will be interesting to know by-and-by how many of the various costly expeditions which the different governments have sent to different parts of the world to observe the transit have had daguerreotype plates amongst their other equipment, and competent daguerreotypists on their staff of photographers. Has no one pointed out before it was too late the "infinite" superiority of the daguerreotype over the collodion process for work of this kind? Is this a new idea which has only just dawned upon the minds of men of science? No, indeed. Very many times during the last ten years one man, standing almost alone, has contended in print for the truth of that "curious admission" of the Astronomer-Royal. It is due to Mr. Sutton to state that over and over again, in these and other columns, he has *implored* men of science to turn their attention to the daguerreotype process, instead of collodion, in all those researches and for all those purposes where the greatest possible accuracy and the highest technical excellence are required. Let it, then, be understood henceforth that the collodion process is for artists and not for *savants*, and let the latter lose no time in giving it up for the silver plate. Let them remember, also, that the process of Daguerre has the inestimable practical advantage of being a dry instead of a wet one, and that the sensitive plates will "keep."

After alluding to Dr. Janssen's photographs of the transit, taken at Nagasaki by his "revolver," upon daguerreotype plates, at the rate of about one per second, *The Times* of December 11th observes:—

"It is to be regretted that, whether we get photographs or not at Kerguelen's Land, it is all but certain that we shall have no daguerreotypes, and we regret it because, while doctors differ about collodion films, there is an universal agreement that daguerreotypes are much more delicate and give clearer details, and, furthermore, bear considerable magnifying; and although they cannot be copied conveniently, on the other hand they are not so easily broken."

In one respect the writer of the above is happily mistaken. Daguerreotypes *can* be copied very conveniently and successfully indeed.

Not long ago, in a leading article in this Journal, it was suggested that the daguerrotype process might be useful even to landscape photographers, and that excellent negatives might be taken from positives upon silver plates by means of a copying camera. This reminds us of the new copying instrument called the "reflectoscope," lately introduced in Paris by M. Van Tenac, and that we have a few more words to say respecting it, having already briefly alluded to it in some former *Notes*.

This instrument may either be used as a magic lantern for exhibiting enlarged images of opaque objects upon a screen, or for taking enlarged negatives of opaque objects, such as card portraits or daguerreotypes. The advantage of the latter method of obtaining enlargements is that no transparent positive is required, and that, consequently, one operation is suppressed. The object to be enlarged is illuminated by the rays from a magnesium lamp thrown rather obliquely upon it.

M. Hannecker, says the journal *Les Mondes*, has obtained a very brilliant light by passing a jet of oxygen into the flame of a spirit lamp, and directing the flame upon a cylinder composed of the carbonates of lime and magnesia and olivine (which is a natural silicate of magnesia) compressed by a hydraulic machine.

A short time ago Dr. Vogel published some further observations on the question of the variability of sensitiveness of silver salts according as they are modified by different superadded compounds. He esteems it an established fact—the result of many observations—that the sensitiveness of bromo-iodised plates is sensibly increased by the presence of other bodies, such as nitrate of silver, nitrate of mercury, morphine, pyrogallic acid, tannin, and the like. They are sensitising agents not merely because of their capacity to affiliate iodine, but often by their light-absorbing properties. For example: pyrogallic acid may be an accelerator or a retarder of the action of light according as it is used in a manner that retains or transmits the light. A solution of pyrogallic acid on an iodised plate, for example, diminishes the sensitiveness of that plate because it makes the film transparent; but if the solution be allowed to settle into the film, and form an opaque coating, then the sensitiveness is greatly augmented.

It is very noteworthy, however, that certain combinations with bromide of silver work quite differently from those with iodide or bromo-iodide. Take, for instance, morphine. A solution of morphine of the strength of one gramme to 1400 grammes of water has a powerful sensitising influence upon a bromo-iodised film, strengthening even its sensitiveness for the green and yellow rays yielded by the spectrum. With new bromide of silver, on the other hand, no such effect is produced. Whether by working upon ordinary objects of photography or on the image of the spectrum the effect is the same, and even with dry plates shows a retarding rather than an accelerating of the sensitiveness. Pyrogallic acid yields a like negative result with the morphine, and these results are by no means singular.

Similar results are to be obtained by additions of various colouring matters to the film, as, for instance, fuchsine. This substance makes bromide of silver very sensitive to the yellow rays—so much so that with exposures of any length the yellow parts of the image show more complete development than the blue. But its effect is altogether different with chloride of silver. In this case, with a tolerably short exposure, no perceptible influence at all is discernible; with a long exposure, however, a certain strengthening of the impression from the yellow rays may be visible, but not to the extent which takes place with the bromide film. From this it is apparent that it is unsafe to infer from the action of an accelerating agent upon one silver salt what its results will be with another.

The explanation of these divergences and varieties of results lies, in the opinion of Dr. Vogel, more in the domain of physics than of chemistry. The plate is clearly only affected by the rays which the film absorbs. Absorption is ruled, however, not merely by the action of the superadded colouring matters or by the nature of the sensitising agencies, but also by the peculiar action and reaction which these two have upon each other under various conditions and with various collodions. Quite neutral substances may in such a case often have a distinct influence. Fuchsine dissolved in alcohol, for instance, absorbs only yellow and yellowish-green rays, but if dissolved in ether or collodion it has also power to absorb the orange rays; hence comes it that fuchsinised bromide of silver is sensitive for both these colours. That chloride of silver shows less susceptibility to the influence of these superadded agents can only be accounted for by supposing that that salt of silver exercises in some fashion as yet unknown a modifying influence upon the behaviour of the fuchsine.

Dr. Vogel is pursuing this investigation further. So far he has come to this conclusion, however—that in practising dry-plate photography it is never a safe rule to hold that a preservative which has been proved good for iodised should also turn out equally good for bromo-iodised plates. And we should say that Dr. Vogel is in the right there; but, so far as the drift of these investigations go generally, it is as yet a little difficult to make out their practical aim. Still they are interesting and highly ingenious.

Herr Fritz Haugk has revived, in the *Photographisches Correspondenz*, the recommendation of permanganate of potash as a means of testing for hyposulphite of soda in the water of washed prints. His process is not much different from that in use years ago and recommended in various quarters; but, as the plan has probably dropped out of sight, and as it was a very good and sure one on the whole, its recapitulation may be useful. He does not use the permanganate alone, but mixed with chemically-clean soda; five grains of soda and a minute piece of permanganate—about the size of a pinhead—are mixed with four ounces of water, and the solution is at once ready. The mixture should be used immediately. If kept it precipitates and loses its delicate power as a reagent, and even if filtered pure will not be reliable as a test.

The manner of using the solution is simple enough. Two perfectly-clean test tubes should be filled to an equal depth with it, and into the one some spring water, absolutely pure, and some distilled water whose quality is known, should be poured, and into the other the last water taken from the hyposulphite prints and water in which they should have lain for a little time, and from which they have been drained. If there has been much soda in the washings the solution will be coloured wine yellow; but if there has been comparatively little, then the tint will be the colour of chamois skin; while with only a slight trace it will be flesh red. A very minute quantity demands that the two glasses should be compared by transmitted light, and hence the necessity of diluting both to the same degree; but the tints named are discernible at once by the naked eye. The normal tint of the solution diluted with pure water only is a sort of cochineal red; but a very slight trace of hyposulphite of soda makes a sort of morning red—a dark flush colour—in the fluid, and a slightly greater trace a dark flesh red. Much will depend upon the care with which the tints are observed whether the value of the test be fully availed of or not; but if due care be taken to use the test there is no help which would be more valuable to the photographer who deals with hyposulphite of soda.

PHOTOGRAPHIC EXPERIENCES IN NEW ZEALAND.

[A communication to the London Photographic Society.]

The album of fifty views and the eight framed pictures, illustrative of the geographical, floral, and economic features of New Zealand, which I had the pleasure of showing at the recent Exhibition, form part of a larger series of about 250 plates taken by the wet process under difficulties of travel and climate, and not without some personal risk. They represent the work of four years, directed by the experience of a much longer residence in the colony, which is necessary in order to know how to travel this wild and mountainous country, as it is only at certain periods of the year one can venture on such journeys—for instance, crossing the New-Zealand Alps from the east to the west coast in the South Island; and, to show the difficulties I had to meet, I may mention that I was ten days camping on the banks of the Otira river, during a heavy storm of snow, hail, and sleet, before I dare attempt to cross, it was so flooded with ice-cold water coming down from the Alps. I frequently had to ford one river many times, on one occasion no less than twenty-three times; sometimes we had to drive the horses into the rivers and swim them over, heading them to the most convenient landing, and then had to ride many miles wet to the skin before finding a convenient place for camping down for the night. At other times I had to depend on my gun for food; and on several occasions I was nearly eaten up by mosquitoes and sand-flies. The views were mostly taken by camping out with one or, occasionally, two companions, and moving from place to place, sometimes by coasting-steamers or small cutters and schooners when visiting many of the out-of-the-way places on different parts of the coast; while my journeys inland were made with a couple of pack-horses to carry the baggage (photographic and otherwise), following beaten paths whenever I could find them, but at other times taking my way through Maori tracks, fords, and bush, crossing dangerous rivers and swamps, with native guides or mounted escort, when I was travelling into the interior of the North Island, furnished with credentials (written both in Maori and English) kindly given me by the Hon. Donald McLean, native Minister, as at that time, when at Lake Taupo, I was not safe from the rebel chief Ti Kooti, for whose head there was a reward of £5,000.

Some of the plates have historical value, as—Poverty Bay, the first point seen by, and first landing-place of, Captain Cook in 1769; Mercury Bay, where he observed the transit of Mercury, first found fresh water, unfurled the British colours, and claimed New Zealand in the name of King George III.; Bishop Selwyn's first settlement (Waimate), Bay of Islands; Akaroa and Banks's peninsula on the east coast, where the British flag was first planted; in the Middle Island, Maori relics of various kinds; the scenes of the wars; and the festivities connected with the visit of H.R.H. the Duke of Edinburgh, in 1869. Other illustrations pourtray the machinery and huts of the gold-diggers, the making of flax-rope, hauling kauri timber out of the bush, and shipping the same, road-making, and other industrial operations.

Natural history is represented by the *Apteryx*, (or Kiwi of the natives, the wingless bird of New Zealand) and the *Dinornis*, or Great Moa skeletons in the Canterbury Museum, by rock sections, &c.; and plate 58 represents an immense boulder of conglomerate, forty-four feet in circumference and perfectly spherical, which is now lying on the beach at Hokianga, near the residence of Judge Maning (the author of *Old New Zealand and the Pakeha Maori)*, with whom I spent several very pleasant weeks. This remarkable geological phenomenon, if of glacial origin, as is surmised, occurs now in the hottest part of the islands, namely, the upper extremity of the North Island. Such boulders are to be found of every size, from the ounce bullet upwards; the small ones were used by the natives in their tribal wars for loading their guns. The tropical plants, Nekau palms, great fern trees, black and white pines, *Phormium tenax* (New Zealand flax), and the flora generally are shown in a variety of scenes and combined with every variety of landscape, their forms being accurately delineated, whilst one feels the more regret in being obliged to add that the magnificent colouring of the valleys and mountains cannot yet be reproduced by the help of the photographer.

A few native groups and Maori settlements, with figures and costumes, come within the branch of ethnology, the grand geographical and geological features of the country being dealt with in a special series of photographs, twenty-four in number, representing the boiler-geyser system of Roto Mahana and Lake Taupo, which extends for about 160 miles inland, near the centre of the North Island. Another series of sixty plates shows the fine range of mountains forming the back-bone of the South Island, and known as the New Zealand Alps. Mount Cook, the highest point in this chain, has an altitude of 13,200 feet (nearly as high as Mont Blanc), Arthur's Pass 5,000, and the Rolleston glacier being about 8,000 feet above the sea. When I crossed these mountains in February, 1858, I travelled a distance of nearly 200 miles from Christchurch, in Canterbury, on the east coast, to Hokitika, in Westland, on the west coast, and the same on my return journey. The snow-capped peaks and the gorgeous foliage of the virgin forests, showing the beautiful rata trees in their intense foliage one mass of crimson, growing up close to the very ice, are admitted by all travellers to be of surpassing beauty; these were seen to the greatest possible advantage, this being about the height of the New Zealand or antipodean summer.

My usual plan of proceeding was to erect an ordinary digger's tent, supported upon a couple of forked poles and well fastened down with guy-ropes; then, from the ridge of the structure, suspending a square photographic tent made of mackintosh material, with black calico skirts resting on the ground and kept securely fixed with stones. In fine weather this supplementary operating-tent was erected outside the ordinary dwelling; but at other times better protection was afforded by suspending it within the larger tent. A square window of yellow oiled silk, measuring about eighteen inches in both dimensions, admitted enough light to work by, and was, of course, proof against fracture during my journeys. A pack-horse carried a couple of strong leather trunks slung from the saddle, in one of which the chemicals were packed, while the apparatus was placed in the other. The camera-legs, folded tent, and stereo. camera were carried aloft on the back of the animal, between the panniers, and the second horse had enough to carry in the shape of the ordinary *impedimenta* of a traveller. When disposed for work the two boxes were placed within the tent, unpacked, and the dipping bath filled from the contents of two or three Hollands' bottles holding the silver solution, secured until now by corks protected with india-rubber finger-stalls. The top of each bottle was carefully tied over with a piece of cloth. I have never used stoppered bottles, preferring to carry collodion and solutions packed in this manner. I learnt this from a sad mishap I once had, when I lost nearly everything through using stoppered bottles. One of the empty trunks was used to support the dipping bath and screen it from the light and dust whilst sensitising; and the other formed a convenient table with a primitive stool in front, consisting of a wooden board twelve inches long by four inches wide supported upon a single leg. My developing dish was a square tin tray six inches deep, and measuring about 20 × 16 inches.

Besides the stereoscope camera I carried a 12 × 10 Kinnear bellows camera. The optical instruments consisted of Ross's triplet for distant views (some of my Alpine views were taken by this lens; No. 167 shows the Alps forty miles away up the river beds), while I used Dallmeyer's wide-angle rectilinear lens for closer studies. Some idea of the range and performance of the last-named instrument can be judged from plates 117 and 133, where a palm tree thirty or, at most, forty feet from the camera is seen with satisfactory definition, the distant ranges, four miles away, being likewise sharply focussed. With a quarter-inch stop eight seconds was the ordinary exposure, and I never, as a rule, exceeded twelve seconds.

I may mention that it was found necessary in a dry climate to pass a moistened sponge once round the inside of the camera, and then to wash out the dark slide, so as to guard against the too rapid drying of the plate, and that thirty-five minutes was the longest interval that was allowed to elapse between the preparation and development of the negative. Three or four folds of moistened red blotting-paper applied to the back of the sensitised plate likewise assisted in preserving a moist film; to keep out light and dust the carrier was always enveloped in a black velvet bag. I should mention, also, that a very convenient dipper was made for me in the colony out of a flattened ribbon of pure silver, made in the usual form of the wire dippers, but with strengthening bands placed at intervals to give greater rigidity. Out of seventy plates exposed during one of my tours it was only necessary in four instances to repeat the operation on account of misjudging the time, and the same number of negatives (four) were lost by fracture during transit. For developer I commonly used a thirty-grain solution of the double sulphate of iron and ammonium, containing, in addition, half its weight of sugar, and intensified, when necessary, with pyrogallic acid and silver. All the plates were fixed with a dilute solution of cyanide of potassium, and then washed with water from a tin kettle holding about a gallon, which served me, besides, for making the tea and for other culinary purposes. The collodion and varnishes were supplied to me by a well-known maker, and I had never any trouble with them. The glass baths furnished in my original outfit unfortunately got broken; and this mishap occasioned a delay of three months whilst another dipping-bath, made of porcelain, was being forwarded from Sydney. This I found far preferable; there was less danger of breakage, and I could always have a clean bath by changing the bottles holding the bath solutions.

Under favourable circumstances my kit was unpacked, mounted for use, and the 12 × 10 plates, besides the stereo. negatives, taken in the space of three-quarters of an hour. This was when not camping down to stay. I had simply to choose a sheltered place from the wind and sun, make my tent fast under the limb of a tree, and commence operations. All the boxes were fitted with divisions, so that everything could be replaced for resuming the journey in the shortest possible interval.

The supply of water was at times one of my greatest difficulties; for when near the boiling springs I found everything so charged with sulphur and mineral matters that it frequently became necessary to send a distance of two miles or more to obtain a sample sufficiently pure. The natives generally knew where to find it; but it was so thick, from being ladled up with a calabash, that I had to allow it to settle before using it. The springs also were often far away from my scene of operations, and fetching the water was sometimes a very vexatious undertaking, much more so than the cooking of food, which in this district was almost an automatic proceeding. During my stay of eight days at Roto Mahana all our food (consisting of hams, fowls, eggs, potatoes, &c.) was cooked either in the boiling holes or by making a hole in the ground in places, when steam would immediately rush forth. By placing our food in a Maori kit or basket over the hole and covering it with fern it was very soon cooked; in fact, all through the country, up to the head of Lake Taupo, for over 100 miles, the natives cook their food in this way. In the foreground of plate 86 will be seen the hole which served me instead of a kitchen fire, and close by are some native women watching their own cooking operations. On the hill-side, to the right of the picture, was H.R.H. the Duke of Edinburgh's camping-ground when visiting the hot lakes. Plates 79 and 80 will help to explain the active nature of the geysers, from one of which the boiling water rises in a six-foot column to the height of about forty feet, at intervals, which I counted when on the spot as recurring every eleven seconds. I was informed that sometimes it reaches to the height of 100 feet or more. The depth of the principal crater is unfathomed; and I am told that the bottom has never been sounded. All the food for several hundred troops was cooked in this geyser, when they were fighting Ti Kooti in the neighbourhood. It is very dangerous to go too near it. This boiling-geyser system at Tokanu is at the head of Lake Taupo, the lake to which I am now referring; it is 1,250 feet above the sea level, and overflows into the Waikato river. At Roto Mahana, or Hot Lake, is a series of chalcedony terraces, of marvellous pink and white colour; the water running over these terraces continually overflows from the crater. At the top the temperature is 212° F.; it fills the different basins, and forms the convenient hot baths in which the natives frequently indulge, and in which they sit in groups for hours together, smoking their pipes. I have bathed in most of these throughout the whole country, and, like the natives, never felt inclined to leave my bath, they are so truly luxurious. The different salts in the water make the skin peculiarly soft; they are a sure cure for rheumatism, but are very relaxing if you stay in too long. Throughout the whole district, from Lake Taupo, going north, to the coast on the banks of the rivers, the temperature can be so modified, by diverting the flow of hot water, (by stopping up with a clod of peat), that a bath can be had of any desired temperature. Plates 86 and 94 show some natives enjoying a natural tepid bath. This fact, taken in connection with the magnificent climate of New Zealand, may some day be extensively utilised for curative purposes. At present there is no difficulty in the way, inasmuch as the hostile chief Ti Kooti is no longer a terror, he being safe in his hiding-place in the Waikato country. Good roads have since been formed, and a coach is now running from Auckland through the hot-lake country to Lake Taupo and Napier on the east coast. Military roads are also being opened up all over the country, and redoubts built at intervals by the armed constabulary for the protection of the settlers and travellers. D. L. MUNDY.

PRESENTATION TO THE PRESIDENT OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual dinner of the South London Photographic Society, which took place on Thursday last, the 17th inst., was this year graced by an event of an exceedingly pleasing character. The members had long desired to present to their President, the Rev. F. F. Statham, M.A., F.G.S., some slight acknowledgment of the esteem in which he is held, and accordingly, and quite unknown to that gentleman himself, it was determined to take advantage of the annual dinner to carry into effect such gracious intention. On this occasion about sixty gentlemen sat down to dinner at the Café Royal, Regent-street, the President occupying the chair, and Mr. Jabez Hughes the vice-chair.

At a fitting period of the evening Mr. JABEZ HUGHES, referring to the large number of gentlemen present, said that such an unusual attendance would perhaps surprise their President, who would, however, imagine that there was some special cause for the increased attendance on such an inclement evening. There was a cause, and he would inform him to what it was due. They had, as a Society, been in existence for fifteen years, and during the whole period had been under his (Mr. Statham's) presidency. The great success which had attended their efforts in doing their work as a Society was attributable to their having as a President a gentleman of culture and education, who was eager to do all that lay in his power for the Society, both in season and out of season. Whatever might happen the President was sure to be found at his post, always ready to stimulate and encourage the members; and this he had done for fifteen years without neglecting his own special duties. To this they were indebted for the present prosperous condition of the Society. What they desired to do upon that occasion was to tell their worthy President how much they esteemed him, and to ask his acceptance of a life-sized portrait painted in oils on an autotype enlargement on canvas. [The large easel upon which the picture, covered up, had been placed in a corner of the dining-room was here wheeled forward, and the picture uncovered amid prolonged applause.] He desired, in the name of his fellow-members, to request the President's acceptance of the portrait, together with an address, engrossed on vellum, as a small token of the esteem in which he was held. He (Mr. Hughes) then read the address, which was richly illuminated, and which is as follows:—

To the REV. F. F. STATHAM, M.A., F.G.S., *President of the South London Photographic Society.*

DEAR SIR,—We, the members of this Society, take advantage of this auspicious occasion to express in a more definite manner than usual our heartfelt thanks and gratitude for the long-continued and invaluable services you have rendered to our Society.

From the time when it was first established—now more than fifteen years since—you have graciously and unceasingly aided in its development and prosperity. We are proud to acknowledge that you are the first and the only President that we have had, and we hope the day is far distant when you will cease to hold the office you so nobly occupy.

Under your fostering care the Society has become one of the most important in the kingdom, and the present advanced condition of photography we believe to have been produced in a considerable degree by the labours of this Society. During the many years that you have presided we have felt the elevating influence of your wise counsels, accompanied, as they always have been, by your winning kindness; these qualities have endeared you to us all. That ardent love of knowledge, that keen appreciation of the truths of science and the beauties of art that distinguishes yourself you have infused into us. It has ever been your earnest purpose to encourage the humblest merit as well as the highest talent, and by your guidance and zeal the Society has acquired its high position.

The present year will be commemorated by the presentation to the members of a noble portrait of yourself, taken by our talented Vice-President, Valentine Blanchard, and we request you to participate by receiving from us a life-sized oil painting from the same portrait. We ask you to receive this testimonial in no way as a fitting recognition of your merits, but only as an outward and visible sign of that deep inward feeling of admiration and affection that we all entertain for you.

We also wish that you and your family may long be spared to enjoy health and long life, and that there may be showered upon you and upon them every happiness and blessing that this life can afford.

December 17, 1874.

The address was signed by Mr. Cocking, the Secretary, on behalf of the members.

The PRESIDENT said that he had been quite taken by surprise, not having the slightest idea that they were to make him any presentation. He was quite unable to respond in a manner adequate to the feelings he entertained. The present they had given him was the most valuable one they could have thought of, and it would be cherished by his family and descendants. He thought, however, that they had overrated his services to the Society. One great reason of their success and harmony was that they were a band of friends who cherished great love for photographic science, and it was a characteristic of their meetings that the youngest member could utter his thoughts without being repressed. For his own part, he had made some of the most enduring and valuable friendships in that Society he had ever formed.

It may here be stated that the negative from which the enlargement was made was 15 × 12, specially taken by Mr. Blanchard for the presentation print to the members this year.

A succession of toasts usual to such occasions here followed, and in the course of the evening speeches were made by several gentlemen, including Dr. Mann, Messrs. Spiller, Bird, Davis, Howard, Fry, and others.

The company dispersed at a late hour.

Correspondence.

NOTES FROM AMERICA.

THE results of a four months' trial of the Liverpool Dry-Plate Company's permanent emulsion, under the most difficult circumstances (except extreme tropical heat) in which they could be used, will, I believe, have some interest for your readers who are dry-plate workers.

I brought with me from England in July some five-ounce bottles of the emulsion, and some of the dry preparation, with a few prepared plates. The latter I used in the backwoods during the month of August, and the emulsion I have used at intervals until the end of November, when I gave the remaining half of the last bottle to Professor Draper, in New York. It had not lost any of its qualities during this time, and seemed, indeed, to give a more even and textureless film than when first prepared.

I coated my plates at night sometimes by the camp fire, or, if I was staying at a hotel, in my room, allowing them to dry spontaneously or before the fire of the camp, and could perceive no difference in the results, except when the air in the room was so cold as to make the drying too slow where drying marks sometimes appeared. I found the best plan on the whole, if in doors, to put the plates when coated on one corner on a shelf, with a wad of paper to rest on, and *the coated surface outward.* When this was turned to the wall drying streaks almost invariably appeared, and if the mantel-piece was of marble or metal, and the plate rested on one edge, an insensitive streak appeared along the edge which rested on the mantel-piece.

The substratum of albumen showed no defects from the packing of the plates in close packages back to face, as they would be carried it clean; but I found that, if the plates had been long coated with albumen, they blistered more or less under development, and I finally adopted the edging of india-rubber and careful cleaning of the plates beforehand as preferable to the albumen substratum. In this treatment I found no blistering or slipping of the film, which showed great tenacity and power of resisting a jet of water unless it were perforated in some way.

I may safely say that I have never had plates so reliable by any process whatever, my only failures being from insufficient or (very rarely) too long exposure, thinning the emulsion too much, which produces a flattening of the negative from want of sufficient silver to make up the high lights, or accidental imperfections from substances carried into the emulsion in coating and not filtered out.

I have used them at temperatures at which wet collodion was impracticable from coagulation of the silver solution on the surface of, and in, the film, and in the heat of an American August, without perceiving any difference in their action. In short, I have given them a practical test which nothing could add to except their use in the sands of the Sahara or in the jungles of India or Africa.

In the matter of over-exposure I have found that an enormous latitude was allowable, but that when *much* had been given—say six to ten times what was requisite—it was best not to use ammonia, but, on pouring on the pyro. alone and finding the exposure too great, to add acid silver, or, if ammonia were needed to bring out the shadows, to wash it off as soon as all the details were visible and go on with acid pyro. and silver. I enclose prints from various negatives taken in my excursions, most of which, however, are printed with a paper much too strongly sensitised for my negatives, which are always intensified for a paper prepared with a weak silver bath.

In experimenting with this emulsion wet, I find that using it, according to Mr. Sutton's directions, with a dilute albumen made barely alkaline, it works very rapidly; and in several trials against Mr. Black's acid bath I found it to be about twice as sensitive as films prepared by his formula and bath. In October, a plate exposed on a well-lighted view of housetops, with a rapid rectilinear lens, stop No. 4, required three seconds; Black's plate taking six. When the preservative is used with dilute glycerine its sensitiveness is about the same as the ordinary wet plate, according to Black's formula, which I am satisfied is fully up to the standard of ordinary wet collodion. I have seen 14 × 11 views taken by Black, in this late season, which were fully exposed with twelve seconds of the smallest stop, but one of an ordinary long-focus view lens; and in a yellow, November light, I found plates sensitised in a bath prepared for me by Black's operator to be fully exposed with ten seconds of a rapid rectilinear, stop No. 4. The negatives required no intensification, though the bath was only twenty grains per ounce when first prepared, and mine was taken from the stock bottle of the establishment.

And, *apropos* of Black, I am tempted to say a word about spirit photography as practised here by one Mumler, who has been producing spirit pictures by some process known only to himself. Mr. Black, at the request of certain of his friends, paid Mumler a visit, and, taking all the usual precautions of cleaning and marking a plate, seeing it coated, exposed, and developed, was certainly startled by seeing the "spirit image" on it, though he supposed he had taken every precaution against deception. He thereupon made Mumler a proposition to take his (Black's) four-lens camera for the experiment, proposing further to pay him five hundred dollars and publicly acknowledge the reality of spirit photography if he could produce four identical spirit portraits on one plate. The challenge has not been met up to this day. Here is a fair offer—if a spirit be in the way of one lens it should be of four pointed to the same object, and no difficulty ought to be experienced in getting four portraits of the identical spirit on the same plate. A careful examination of several of Mumler's photographs convinced me that they are the result of a trick, the images in several instances being evidently taken from bad drawings, anatomically incorrect, and in one case where two spirits appeared they were lighted from opposite directions. In most cases the images are so vague as to be capable of being taken for almost anybody. In short, I think that until someone accepts Black's challenge and gives us four identical "spirit images" on one plate, we need not trouble ourselves much about the legerdemain of the thing.—Yours truly, W. J. STILLMAN.

Boston, U.S.A., December 1, 1874.

P.S.—Most of the views I have taken lately, and which I enclose, were taken with the new Ross' lens (symmetrical), using the full opening. Its working is simply marvelleus, and deserves more notice than I have space for in this already too long communication.—W. J. S.

"THE NEW LENS."

To the EDITORS.

GENTLEMEN,—Mr. Dallmeyer's letter in your last issue will scarcely be accepted as conclusive. Avoiding unpleasant "reiteration of facts," he considerately procures an opinion for guidance, and thus, by withholding any direct expression of hostility, spares the feelings of those who cannot recognise his supremacy as a patentee. In this I find no fault. The opinion is of the character required; an adverse one would not suit, and would have found no place in your pages.

Unhappily, the stability of a patent is in no way established by the opinions of agents, who merely obey the instructions of applicants for all kinds of ridiculous and untenable *inventions*, as every year's list can testify. The legal status of patent agents is not admitted, and is without weight in a court of law. The verdict as to whether a patent has been infringed or is altogether null and void depends upon the interpretation and evidence of experts practically familiar with the branch of science or discovery to which it relates. Many patents become invalid through *ignorance* of the re-existence of a similar claim; but oftentimes the forlorn hope is indulged that some invention contained in a previous patent that has lapsed and apparently been forgotten may possibly be appropriated and embodied in a new one—a doubtful chance indeed.

It now seems that Mr. Dallmeyer, at the time he obtained his own, was aware of the existence of Mr. Grubb's, patent—a remarkably clear one; for he (Mr. Grubb) gives a large diagram of the form of lens that he specially claims, and states distinctly how another and similar one is to be used in combination with it. Mr. Dallmeyer must have felt the importance of monopolising this form, but his inattention to the suggestion of the law is unfortunate for him; for this was a peculiar case for specifying in his *own* claim *what is new* and *what is old*, and therein to make reference to Mr. Grubb's patent and to point out where his own differed, and in what particular a special claim could be made. As it is now stated, anyone availing himself of the prior invention of Mr. Grubb, and presumably working on his expired patent, cannot distinguish the difference.

It may be asked why I take up this question. For this reason:—During the last year, by my aid and advice, *several hundreds* of combined pairs of lenses have been made by Messrs. Ross & Co. embodying Mr. Grubb's principle, viz., *with a denser material, or flint glass lens, in each combination outside* (Dallmeyer's chief claim). I presume Mr. Dallmeyer is cognisant of this, as these lenses have been continuously and openly advertised. I am desirous that this fact should have all publicity, as I wish to avoid the imputation of acting surreptitiously when I believe that the right is clear.

Mr. Grubb's formula is merely modified for a special kind of glass made for the purpose, and the curves adapted in accordance with recent discoveries in oblique pencils; but in general form and arrangement the construction is similar.—I am, yours, &c., F. H. WENHAM.

7, *Wigmore-street, Cavendish-square, December* 21, 1874.

MONOHYDRATED NITRIC ACID.

To the EDITORS.

GENTLEMEN,—Please insert in next week's issue an answer to the following:—What is monohydrated nitric acid? How is it prepared? or how is it procured?

Dr. Van Monckhoven, in an article on the preparation of a very sensitive paper for enlargements, in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1868, page 115, uses this acid in connection with sulphuric acid and white loaf sugar (equal parts) for producing "nitro-glucose."

I fail in getting a precipitate, although adhering strictly to his formula, excepting, as I suspect, in the monohydrated nitric acid. I have used the acids of different strengths from pure to half water.

Please favour me with any information you can on the subject, and you will greatly oblige.—I am, yours, &c., JAMES YOUNG.

Manchester, December 18, 1874.

[Monohydrated nitric acid is difficult to obtain in commerce, being kept only by a few chemists, such as Hopkin and Williams, Morson, and some others. It is made by mixing the strongest commercial acid with an equal quantity of oil of vitriol, redistilling, collecting apart the first portion that comes over, and exposing it to a current of dry air made to bubble through it until the nitrous acid is completely removed. Its specific gravity at 60° Fahr. is 1·517.—EDS.]

SWING FRONTS AND STAINED NEGATIVES.

To the EDITORS.

GENTLEMEN,—I have read with interest your excellent chapter on swing backs and fronts in the number for December 4, as also Mr. M. Carey Lea's remarks thereon in his *Manual*.

I have used a swinging front of my own adaptation for some years, and I feel sure it will do all that a swing back can be made to do, provided the camera be fitted with rising front to take the lens above and below the centre as required, although I must admit it is more troublesome of adjustment; but this is again, in my opinion, counterbalanced (in outdoor work) by the greater lightness and less bulk of the camera. Do you not hold similar views?

One of my negatives, which has been printed from for some time, has become stained all over of a deep orange colour. It is a very dense negative, and takes some time printing; and as none of my others have been similarly stained I am rather at a loss to know the cause, but suspect it is from the varnish absorbing silver from the paper. Am I right in this?—I am, yours, &c. ROBERT BRIDGART.

70, *Friar Gate, Derby, December* 19, 1874.

[See leading article on this subject in another page.—EDS.]

BRONZE POWDER.

To the EDITORS.

GENTLEMEN,—I believe the small spots being complained of just now by our continental brethren are probably to be accounted for in another way from any mentioned by them in their discussion of the matter.

I think many who have had gold-printed mounts will be able to say that occasionally they have been bothered with such spots. All is not gold that glitters, and assuredly that is not always gold which looks like such upon *carte* and other mounts. *Bronze* is the word for it. Take my word for it, or make an experiment in your studio and deeply regret it. If your readers value peace of mind and patience of soul they should not let a particle of this vile dust enter their doors. In my innocence I once bought some "gold bronze" powder in order to do a little handy gilding myself—and, were it not for the danger attending it, the thing is effective and easily done; but, of all the diabolical and agonising troubles that afflict photographic flesh, that gold bronze was the crowning crusher. It doubled me up, and metaphorically danced upon me. It is a powder of the most insinuating sort. It spreads and wafts itself abroad, I almost think, by a kind of inherent property. It sticks, and clings, and catches at everything. You cannot keep it by itself—it will be all over the place.

Oh, gentlemen! the memory of that calamity makes me shudder! Be warned and touch it not. Have nothing to do with it in any shape whatever. If you do, you will remember what I have said, and repent you did not take my advice. I presume pure gold printing will not injure a photograph in the slightest if we could be sure of getting it; but that is the difficulty.—I am, yours, &c.,

Edinburgh, December 15, 1874. AN OLD PHOTOGRAPHER.

[The effect likely to be exercised by bronze powder upon photographs may be judged of from the following receipt for its preparation:—Verdigris, eight ounces; oxide of tin, four ounces; bichloride of mercury, two drachms; borax and nitre, of each two ounces. Make this mixture first into a powder, then into a paste with oil, and fuse. When cold roll into sheets and grind. It is no wonder that photographs are injuriously affected by a compound of such a nature.—EDS.]

EXCHANGE COLUMN.

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

A really good planed iron lathe bed, three feet six inches long, and two iron standards, value £2, offered in exchange for first-class photographic lantern slides, or mechanical ones.—Address, W. L. B., Sun-lane, Burley-Wharfedale.

ANSWERS TO CORRESPONDENTS.

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

*** As we publish a day earlier this week, several correspondents must remain unanswered till our next. This may also account for the non-appearance in the current number of several advertisements.

T. P.—Thanks for kind enclosure, which has been added to the funds being privately collected.

JACOBUS.—The Vanderweyde process is not practised, or, if practised at all, is little known, in London.

S. W.—You will find that the forthcoming *brochure* will be equal to your expectations. Thanks for kind wishes.

LUX.—Views of Cape Town and Table Mountain can be obtained from Messrs. Prevost & Co., 36, Henrietta-street, Covent-garden, W. C.

X. Y.—You have doubtless overlooked a special article that appeared in this Journal three years ago relative to the subject. The patent has long since expired.

RECEIVED.—*Wilson's Lantern Journeys*; also, Report of Sixth Annual Convention of the National Photographic Association of the United States. These in our next.

J. D.—We have handed your letter to a practical builder, who writes as follows:—"Tell your correspondent that the sum (£500) asked for the house is a very reasonable one, if the seventy feet of paddock is to go with the house. If not, then £400 will be quite enough."

EAST-WEST.—According to the drawing, your space is 90 × 40 feet. The better, nay the only practicable, plan is to build the studio east and west; placing the sitter so as to be illuminated by a north-east light. A suitable size of studio is about 14 or 15 feet by 30 feet. Do not make the walls too high.

E. R. D.—You are right. A "perfect" lens would have no depth of focus; but what photographers want is a lens which, whether perfect or not in the abstract, is perfect for their special requirements, one of which is that it shall have depth of focus, focus in this sense being synonymous with definition.

W. B. P.—1. We are unable to give such directions for preparing tungstate of soda as would render it worth your while to make it, seeing it can be purchased so very cheaply.—2. To ensure the albumenised paper retaining its gloss use a stronger sensitising bath, by which the albumen will be rendered quite insoluble.

REV. B. P.—Powder colours will adhere to the picture most tenaciously, and may be applied with facility, provided a weak solution of Canadian balsam in benzole is previously poured over the surface of the print. Do not apply the colours until the benzole has evaporated, which, however, will be the case in a very brief space of time.

H. J. STREET.—It is quite true that we said a few years ago that an alcoholic solution of shellac was an excellent thing with which to impregnate a wooden bath; but we now say that bees'-wax, applied in the manner described some time ago in this Journal, is also a most excellent thing, and one which with our present experience we prefer.

FRANK M. SUTCLIFFE.—Our correspondent informs us that, under the name of the "*Physiognotype*"—an appliance for taking a cast of the face, similar to that spoken of by Professor Stebbing in last week's number—was published in vol ii. of the *Universal Decorator* in 1859. "The method of fixing the wires," says Mr. Sutcliffe, "was, I think, the same, for the instrument had an outer case that could be filled with warm water, which would, I presume, be for the purpose of keeping the tallow soft, though in the description given it is said to be to keep the *wires* warm, and so prevent the sitter from shivering from cold."

R. S.—Your surmise was quite correct. 1. In practising the "dusting-on" process the operations must be conducted in a darkened room. The sensitive mixture ought to be kept in a bottle cased with brown paper, which, in turn, should be kept in a dark cupboard.—2. Ordinary powdered blacklead will be too gritty and coarse for the purpose; we have, however, sometimes obtained samples of this kind of graphite that were very fine. A careful selection will have to be made.—3. Both the portrait and the landscape suffer slightly from over-printing, and this gives them a heavy appearance, as if the negatives had been under-exposed. The whole of the details, together with quite sufficient vigour, will be obtained if a much shorter exposure in the printing-frame be given. In other respects they are good.

EXHIBITION OF APPLIANCES FOR THE ECONOMY OF LABOUR, 1875.—The Council of the Society for the Promotion of Scientific Industry, the head quarters of which are at Manchester, has decided to give gold, silver, and bronze medals for excellence and novelty in the various classes of exhibits at the Exhibition of Implements, Machines, and Appliances for the Economising of Labour, which is to take place in Manchester, in 1875. The arrangements for the exhibition are progressing satisfactorily, and space has been secured by many high-class engineering and other firms.

THE TRANSIT OF VENUS.—The Astronomer-Royal has received the following telegrams:—From Major Palmer, Christchurch, New Zealand:—"English nothing valuable anywhere; clouds. Americans got ingress, and photographs till near third contact. Nobody egress." From Mr. Todd, Adelaide: "Transit of Venus. Ingress cloudy. Egress well observed. Contacts 3443434.75. (Probably 3h. 4m. 43·4s. and 34m. 7.5s.) No black drop." Adelaide mean time for internal and external contacts. "Well observed at Honolulu and Atooi; cloudy at Owhyhee. Sixty photographs; Janssen failed; internal contact uncertain several seconds; complete disc of Venus seen twelve minutes before; 120 micrometer measures." The French astronomical party at Pekin, under the direction of M. Fleuriais, succeeded in observing the first and second contacts. There was a slight black ligament. Printed photographs were taken. The weather was slightly hazy. The transit of Venus was distinctly witnessed at Malta on the 9th instant. The external egress of the planet from the sun occurred precisely at 7 26 a.m. local mean time.

METEOROLOGICAL REPORT,

For two Weeks ending December 22, 1874.

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

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb	Max. Tem.	Min. Tem.	Remarks.
10	29·73	NW	—	32	41	27	Foggy
11	28·83	SW	40	41	49	27	Raining
12	28·93	NW	39	40	42	34	Dull
14	29·76	NE	34	36	38	30	Dull
15	30·08	N	—	32	35	26	Dull
16	29·52	E	—	34	—	27	Snow
17	30·03	NE	—	33	37	27	Dull
18	30·21	NE	33	35	38	28	Cloudy
19	29·85	NW	37	37	40	28	Cloudy
21	29·50	NNE	—	22	36	26	Cloudy
22	29·75	E	—	29	—	23	Dull

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CONTRIBUTORS.